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Supreme Court of the United States,

OCTOBER TERM, 1927.

No. [redacted] 182

CORONA CORD TIRE COMPANY,

Petitioner,

vs.

DOVAN CHEMICAL CORPORATION,

Respondent.

BRIEF FOR PETITIONER.

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BRIEF FOR PETITIONER.

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The function of vulcanization always has been to improve the physical properties of rubber, and it has long been known that certain substances called "accelerators" both hastened the process of vulcanization and improved the quality of the product.

THE PATENT IN SUIT 14

The patent in suit relates simply to the use of DPG (diphenylguanidine) in vulcanization and is not concerned with any process of making DPG. There is another Weiss patent owned by plaintiff relating to a method of making DPG and that other patent is not in suit.

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The patent in suit discloses only one idea, that DPG is a powerful accelerator, more powerful than TPG (triphenylguandine).

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The Weiss patent is invalid because of publication of the invention in the Kratz paper, plaintiff's effort to prove prior invention by Weiss having failed.

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Although Weiss should have recorded any tests he made while an employee of the Republic Company, the only dated record produced consists of three tests; Weiss admits he altered the date of one of these, and the other two demonstrate no superiority of DPG over TPG. Weiss

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and his principal corroborating witnesses, Daniels and Carlton, are unworthy of belief. The testimony of Nellen and Halliday is worthless as corroboration.

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Whatever invention there was in ascertaining the utility of DPG as an accelerator was completed by Kratz at Norwalk in 1916. Furthermore, there was knowledge of the alleged invention by Kratz and his associates at Norwalk prior to the earliest date claimed by Weiss. Therefore, anyone who made the invention thereafter was not the first inventor, and if a patentee is not the first inventor his patent is void.

SECRECY AND ABANDONMENT 80

Plaintiff's charge of secrecy is unsound in view of the dissemination of Kratz's information with respect to DPG among his associates in at least two Rubber Companies and in view of the reading and publication of his paper. The information contained in the disclosure of the Weiss Patent is less useful for practical purposes than the information contained in the Kratz paper. If there was any abandonment by Kratz, it was abandonment of a completed invention to the public.

THIRD DEFENSE 87

The Weiss Patent is invalid because of the prior use of DPG by Kratz and the Falls Rubber Company.

The tubes made by Kratz in 1917 constitute a prior public use of the alleged invention of the

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patent in suit which invalidates the patent. The evidence is entirely sufficient to establish this prior public use and one instance of prior use is sufficient.

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Weiss is not an original inventor.

The only record evidence produced on behalf of Weiss contains a record of an earlier test with DPG made by Baldwin prior to Weiss's employment by the Republic Company. Baldwin identified this record, and is corroborated by Brill, Clark and Haring. Baldwin could have and probably did obtain his DPG from Eimer and Amend. Weiss made no claim to originality of the use of DPG at various times when he would have done so if he had believed himself the originator.

FIFTH DEFENSE 102

The Weiss patent does not disclose a patentable invention.

Various guanidine derivatives had been known as accelerators and the guanidines as a group and triphenylguanidine specifically were disclosed to Weiss by Carlton. Diphenylguanidine is the next most closely related member to triphenylguanidine and is grouped with it in chemical text books. It was a natural step, therefore, knowing that the guanidines as a group were accelerators and that triphenylguanidine was an accelerator, to use the closely related member DPG.

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Claims 1, 5 and 9 of the Weiss patent are invalid by reason of special matters applying to them only.

These claims purport to cover the use of all "di-substituted guanidines", a class including DPG. These claims are invalid because the subject matter thereof is disclosed in a magazine article published more than two years before the patent in suit was applied for. These claims are invalid because they are broader than any invention made by Weiss. These claims are invalid because there are various di-substituted guanidines which are not accelerators.

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Credit for the commercial success of DPG as an accelerator cannot properly be ascribed to the alleged invention of the Weiss patent in suit; and if any part or all of it is to be ascribed to the patent for Weiss's method of making DPG, that is a matter of no consequence in this litigation.

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The fundamental error of the opinions holding the Weiss patent valid resides in the confusing and combining of the two patents granted to Weiss, only one of which is in suit, and attributing to the patent in suit a commercial success which was the outgrowth of the second patent which is not in suit.

The basis for the rulings of this Court in *Coffin* vs. *Ogden* and *Milburn* vs. *Davis-Bournonville* is that a patent cannot be valid if the invention thereof was previously known, and the alleged invention of the patent in suit was previously known.

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Supreme Court of the United States.

OCTOBER TERM, 1927.

No. 180

CORONA CORD TIRE COMPANY,
Petitioner,

vs.

DOVAN CHEMICAL CORPORATION,
Respondent.

BRIEF FOR PETITIONER.

TO THE HONORABLE THE JUDGES OF THE SUPREME COURT OF THE UNITED STATES:

This suit presents a single issue, *i. e.*, the validity of Letters Patent No. 1,411,231, granted March 28, 1922, to the respondent as assignee of Morris L. Weiss (Vol. II, p. 718).

Jurisdiction of this Court results from the issuance of a writ of *certiorari* to the United States Circuit Court of Appeals for the Third Circuit (Vol. II, p. 1039). The writ was issued because of conflicting decisions of Circuit Courts of Appeals.

This is the second suit in which the validity of the Weiss patent has been adjudicated. The first was brought by the respondent, Dovan Chemical Corporation, against National Aniline & Chemical Company, Inc., in the District Court for the Southern District of New York. The District Court sustained the validity of the patent, (opinion not re-

ported) and on appeal the Circuit Court of Appeals for the Second Circuit, with one member dissenting, held the patent invalid (292 Fed. 555). A petition for a writ of *certiorari* was denied by this Court (263 U. S. 714).

Thereupon respondent brought this suit against Corona Cord Tire Company in the District Court for the Western District of Pennsylvania. That Court held the patent invalid (10 Fed. 2d, 598) and on appeal the Circuit Court of Appeals for the Third Circuit, also with one member dissenting, held the patent valid (16 Fed. 2d, 419).

For convenience and brevity, the first suit against the National Aniline & Chemical Company, Inc., will be referred to as the *National* suit, and this present suit against the Corona Cord Tire Company as the *Corona* suit, and the parties to this suit will be designated plaintiff and defendant.

The Weiss patent in suit relates to the vulcanization of rubber. Vulcanizing consists in mixing a small amount of sulphur with rubber and subjecting the mixture to heat for a period of time, during which chemical combination of the rubber and sulphur takes place. If a chemical of a kind known as an "accelerator" be introduced into the mixture along with the rubber and sulphur, the process of vulcanization proceeds more rapidly and the product is of superior quality.

The patent in suit states that a particular chemical substance known as "di-phenyl-guanidine" is a better accelerator than the ones previously used and it claims a monopoly in the use of that particular chemical in rubber vulcanization.

Defendant maintains that the patent in suit is invalid in its entirety,

1. Because of prior publication of the efficacy of diphenylguanidine as an accelerator in a paper prepared by Dr. George D. Kratz and two others, and read by Dr. Kratz before a meeting of the American Chemical Society.

2. Because of prior invention by Dr. Kratz of the use of diphenylguanidine as an accelerator, if that was an invention

at all, and prior knowledge thereof by Dr. Kratz and Dr. William F. Russell and their associates.

3. Because of prior use of diphenylguanidine as an accelerator by Dr. Kratz and the Falls Rubber Company.

4. Because the idea of using diphenylguanidine as an accelerator was not an original conception of the patentee, and

5. Because the disclosure of the patent does not constitute patentable invention.

These matters all relate to the validity of the whole patent. In addition, there are defenses applicable only to certain broadly worded claims of the patent to which we shall refer later.

Summary of Defendant's Argument.

Defendant's argument that the Weiss patent in suit should be held to be invalid in its entirety is based upon the following propositions:

1. Long prior to the filing of the application for the patent in suit, the invention described and claimed in the patent was disclosed in a paper read by Dr. George D. Kratz before a meeting of the American Chemical Society at Philadelphia, Pa.

The Kratz paper is a complete disclosure of the superior accelerating value of the chemical in question. In particular, the paper expresses that superiority by comparison with the identical accelerator the patent in suit refers to for that purpose. In addition to the contents of the paper itself, there are two most persuasive reasons for accepting the paper as a full disclosure of the patented idea. First, the paper was cited by the Patent Office as a basis for rejecting the application for the patent in suit, and in answer to that rejection no suggestion was made by the applicant that the paper was in any respect deficient as a disclosure of the invention claimed. Second, on two occasions when the patentee of the patent in

suit was soliciting employment long prior to applying for his patent, he referred to the Kratz paper as authority for the value of the accelerator and made no suggestion that the idea of using it originated with him.

The patent in suit was applied for November 12, 1921. The Kratz paper was published in a technical magazine having wide distribution in April, 1920, about one and one-half years before the filing of the Weiss application. Thus the paper is not, in itself, a complete bar to the validity of the patent, for, under the Statute, a patent is invalid when the invention has been "described in any printed publication * * * more than two years prior to his application" (Rev. Stat. Sec. 4886; U. S. C., Tit. 35, Sec. 31). Because of that, the effect of the paper as an anticipation could be overcome by plaintiff by showing that Weiss made the invention before the publication date of the paper. But the paper was read to an assembly of rubber chemists at a meeting of the American Chemical Society in September, 1919, so the invention was then disclosed by Kratz and was then known to him and then became known to those who heard him read his paper. Therefore, to establish priority, it is necessary for plaintiff to carry Weiss's date of invention back prior to September, 1919, to antedate this prior invention and prior knowledge.

When the Patent Office cited this Kratz paper as a basis for rejecting the claims presented, the only reply was an effort to show that the invention was made by the applicant prior to the reading of the paper. The law imposes a heavy burden on an applicant who attempts to carry his date of invention back of an anticipating reference; to succeed, he must establish his contention by evidence "so cogent as to leave no doubt in the mind of the Court". Also, the greater the period of time he attempts to carry his date back, the stronger must his evidence be, and in this instance he was attempting to carry his date back nearly three years. In the *ex parte* proceedings in the Patent Office, the affidavits offered to prove the early date were accepted as sufficient and the patent was granted. In this suit, the same effort has been

made to carry the patentee's date of invention back of the Kratz paper. That effort should be held to have failed, and because of its failure the Kratz paper in itself requires that the patent in suit be invalidated.

That effort should be held to have failed because the testimony offered is so filled with discrepancies as to make it wholly unreliable. The District Court Judge, who heard and saw the witnesses for plaintiff on this point, held them to be unworthy of belief, and established practice requires that an appellate court shall accept and uphold such a finding of fact unless palpable error is apparent. This Court has frequently characterized such a finding of fact by a trial court on the credibility of witnesses as "unassailable". But even if such a finding were less potent, the great weight which common sense dictates should be attached to it should be considered in conjunction with the rule as to the character of proof required of a plaintiff attempting to "anticipate an anticipation". It cannot be that, in the absence of manifest error, a plaintiff's claim to an early date of invention is so proven as to "leave no doubt in the mind of the Court" when the Judge of the lower Court who heard the witnesses produced to prove it and observed their demeanor, concluded that their testimony could not be believed and said so in his opinion.

Furthermore, if independent examination of the testimony offered by plaintiff were now made, it would lead to the same conclusion as that reached by the District Court Judge, namely, that it precludes "giving great weight to the attempt to fix Weiss's discovery of DPG as prior to Kratz's disclosure".

Finally, if all of plaintiff's testimony which is supported by documentary evidence were accepted at its face value, it would be insufficient to establish for the patentee a date of invention prior to the Kratz paper, because all the patentee claims to have done before the Kratz paper was inconclusive, and would have led to nothing of value but for the new impetus derived from the paper.

2. If all plaintiff's claims as to what was done by its patentee and when he did it were assumed to have been adequately proven, and the patent in suit were given the benefit of the earliest date of invention claimed for it, still the patent should be held to be invalid because the patented invention had previously been conceived by Dr. Kratz, and disclosed by him to others, and utilized by him to the point of demonstrating its value. Records of Dr. Kratz's work are before the Court. Their authenticity has not been questioned and they are directly comparable to, and far more definite and informative than the records produced in behalf of the patentee. Also, disclosure by Dr. Kratz to others has been definitely proven and has not been questioned. Therefore, the patentee was not the first inventor and the idea patented was not new. The patentee was not the first inventor because at an earlier date the invention had been made by another; and the invention was not new because that other had disclosed it and made permanent written records of it.

It is futile to say the invention was maintained in secrecy by Dr. Kratz. There is no evidence that effort was made to maintain it in secrecy at the company where Dr. Kratz was employed; and, when he left that concern and entered the employ of another rubber manufacturing company, knowledge of the invention went with him to his new employer and stayed behind him with his old one, that is, with his co-workers who remained in the employ of his old company and in the official records he prepared for that company. Also, publication is the very antithesis of secrecy and Dr. Kratz published the invention in the most effective way such an idea can be published.

It is equally futile to say the invention was abandoned by Dr. Kratz. If he and his associates and the company by which they were employed had done nothing more after the demonstration of the value of the invention, there would be no abandonment which would permit some subsequent inventor to obtain a patent monopoly in the use of the idea. The act of invention had been completed

in all respects. So the only possible abandonment would be abandonment to the public, defeating all efforts of all persons to monopolize the idea at any time thereafter. But the fact is that there was no abandonment of the idea of any kind whatever up to the time when Dr. Kratz gave it to the public in his paper. He made comprehensive records of the idea and left them in the files of the manufacturing company by which he was employed, he made use of the idea in commercial work on a small scale, and he made check-up experiments in connection with the preparation of his paper, and these, together with the writing, reading and publication of the paper, are wholly inconsistent with the idea of abandonment.

3. The patent in suit should be held invalid because of a prior use of the patented idea in the commercial manufacture of rubber articles prior to the earliest date claimed in behalf of the patentee. This prior use was by Dr. Kratz, the author of the paper above referred to, and the Falls Rubber Company with which he was then connected. That company received an order for certain rubber tubes, and, having some of the chemical in question available for use, Dr. Kratz decided to use it and did use it until the amount at hand was exhausted. The chemical was put into the rubber mix by Dr. Kratz himself and no one associated with him knew he had done so. Because of that, there was no available direct corroboration of his testimony with respect to this prior use; indirect corroboration is presented by numerous documents and depositions but direct corroboration was unobtainable. The question thus presented is whether or not this evidence, the limitations of which are and always have been recognized, leads to belief that the prior use actually occurred. The Judge of the District Court who heard and saw Dr. Kratz believed that it did and said so, and we know of no reason why anyone should not believe it. It is true that the law requires convincing proof of a prior use to warrant invalidating a patent, but there is no mathematical

rule as to what constitutes a sufficiency of evidence, and if the evidence submitted, whatever its character and the extent of the corroboration, leads to belief extending beyond all reasonable doubt that the use occurred, then the patent must be held to be invalid for lack of novelty. That is the situation presented here. There is Kratz's clear, direct and comprehensive testimony of what he did and how and when he did it, and in addition there is a wealth of surrounding circumstance set forth in testimony and contemporaneous documents, and the effect of the aggregate of this evidence is to compel belief that the use occurred as alleged.

4. The idea of using the patented accelerator did not originate with the patentee. The very record which is offered in the patentee's behalf in the effort to prove his date of invention shows that the patented idea was conceived by or known to another who recorded knowledge of it in a place where the patentee must have seen it. This is of special importance in connection with the credibility of the patentee, but in addition it establishes that the patented idea was not an original conception of the patentee, for which reason also the patent should be held to be invalid.

5. The patented idea does not involve patentable invention and the patent in suit should be held invalid for that reason. The patented chemical is as closely related as is possible to another substance which had been used as an accelerator before, and the use of which was known to the patentee and mentioned by him in his patent. The two substances are very much the same in name, utility and chemical composition, so much so that in chemical books where both are mentioned, one appears immediately after the other. In this situation, the serviceability of one of these two substances as an accelerator of rubber vulcanization being known, no inventive act was involved in the thought that the other of the two closely related substances might also be an accelerator. Any chemist knowing the two substances to be so closely

related and knowing that one of them was an accelerator, would have assumed that the other was also; and on trying it, he would have found that his assumption was correct; and neither of the two acts or both of them together would have involved patentable invention.

These are the propositions upon which rests the argument of invalidity of the patent in suit in its entirety. Later we shall point out certain matters which relate only to particular broadly phrased claims. These several propositions will now be discussed in detail.

Vulcanization.

Consideration and decision of this suit requires dealing with various chemical substances whose names are seldom mentioned outside the art of vulcanizing rubber, but they do not require consideration or application of any of the abstruse principles of chemistry. It is necessary only that the statement of certain undisputed facts about these chemicals be accepted. Chief among these is that there are certain chemical substances which may be introduced into a mixture of rubber and sulphur, and which, when that mixture is heated to vulcanize the rubber, serve to hasten the process of vulcanization. Because of that capacity, such substances are called "accelerators."

The patent in suit (Vol. II, p. 718) purports to cover broadly the use of one such substance, namely, a chemical called diphenylguanidine, and for brevity sake designated throughout this litigation as DPG. As to four of its 12 claims, the patent purports to be of even broader scope in the respect that it covers the use as accelerators of DPG and all other substances that fall within a class known as di-substituted guanidines. This single idea of using DPG or some other di-substituted guanidine as an accelerator of rubber vulcanization is stated simply and directly in the claims

of the patent, and the single issue presented by this suit is whether or not that idea constituted an invention, and if so, an invention which was the contribution of the patentee Weiss.

The process of vulcanizing is old and well known; its present high state of development represents an evolution of about 80 years. The function of vulcanization is and always has been to improve the physical properties of the rubber, primarily to increase its strength, elasticity and wearing qualities. Practically all rubber, whatever its use, is vulcanized (Vol. I, p. 36, Q. 5).

Vulcanization, or "cure" as it is sometimes called, involves mixing sulphur with rubber and then subjecting the mixture to heat. The amount of sulphur in the mixture is small, as for instance 4 to 10 parts of sulphur to 100 parts of rubber. The remainder of the mixture may be all rubber or it may be partly rubber and partly other ingredients such as fillers and pigments, the other ingredient used most widely being zinc-oxide. For instance, in the manufacture of automobile tires a considerable proportion of zinc-oxide is used; a very common proportion would be fifty parts of rubber, forty-five parts zinc-oxide and five parts sulphur, and this mixture would be vulcanized or cured by subjecting it to heat to make the vulcanized rubber of commerce.

It will be apparent that molds have to be provided for giving the desired form to the vulcanized rubber articles, and that steam has to be supplied for heating the molds and the rubber composition therein during the process of vulcanizing; therefore, the time required for carrying out the process is of importance, for if the time could be reduced by one-half the out-put of a given equipment would be doubled.

Many years ago it was found that the chemical reaction which takes place between sulphur and rubber would be hastened by the presence in the mixture of a substance of the class of what have since become known as accelerators (Vol. I, p. 36-7). The amount of the accelerator employed is small; three per cent. for instance would be a large amount, and a

fraction of one per cent. is quite usual (Vol. I, p. 78, Q. 147-151.). In the commercial manufacture of vulcanized rubber articles, accelerators have been commonly used for generations. Various substances known to chemists have been found to be serviceable as accelerators in different degrees, and one or another of these has been used in practically all manufacturing plants, the particular ones used being dependent upon the judgment of the chief chemist of the plant and the particular rubber articles to be produced. At first, inorganic substances, such as lime and litharge, were employed, but a dozen or more years ago it was found that certain organic substances were even more powerful, or more "active" as is usually said, and in recent years these organic substances have been used almost exclusively (Vol. I, p. 37).

The sole purpose of vulcanization is and always has been to improve physical properties; without vulcanization, rubber would not be useful for most purposes. But the heat to which the rubber mixture is subjected during vulcanization has certain bad effects upon the rubber and the longer the time of the cure the greater the injury; so an accelerator which speeds up the cure and therefore makes it possible to reduce the time during which the mixture is subjected to heat, reduces the deteriorating effect of the heat on the rubber and leads to the production of rubber having greater strength, elasticity and wearing qualities. Thus the primary function of an accelerator is and always has been to shorten the time required for the cure and also to improve the quality of the product. This is embodied in a definition of an accelerator which has been offered by plaintiff and which we adopt, namely,

> "A vulcanization accelerator is a material added to the mixture which hastens the process of cure and improves the elasticity, tensile strength, and other desirable commercial qualities of the finished product."

The nature of the action which takes place was explained by one of defendant's witnesses as follows (Vol. I, p. 533, Q. 11):

> "If the activity of the accelerator is used to cut down the time, you will get a better product. This is ordinarily

considered to be due to this fact; it is quite commonly accepted that vulcanization consists of two different things going on at the same time—the rubber is being broken down or depolymerized by the heat and is being built up or polymerized by the accelerating action, and the net result is what we know as the vulcanized product.

12 Q. Has this bettering of the product through the use of accelerators been known and recognized by workers in the rubber art for some time?

A. Yes, it has been known and recognized, and developed, practically since the beginning of the use of organic accelerators."

The same thing was stated by plaintiff's witness, Carlton, who said (Vol. I, p. 96, Q. 33-4) it was well known that the greater the length of time a compound is cured, other things remaining equal, the lower are the physical properties of the stock at optimum cure, and that the reason for this is that when "the compound is subjected to heat for a less length of time, the physical properties are better" and that "heat itself has a deteriorating effect upon rubber."

This witness said these things were well known and were taught in the colleges long before the dates we are concerned with here (Vol. I, p. 96-7, Q. 33-37).*

So it is manifest that the proper use of an accelerator not only reduces the time required for the cure but also produces a better product, and, within some limits, the greater the activity or power of a particular accelerator, the more may the time of the cure be reduced until the point of maximum physical properties is reached.

Of course there are other factors to be considered, such as the temperature of the cure and the amount of the accelerator used. The production of the high temperature required for vulcanization during the period of the cure is a considerable item of expense, and the cost of the accelerator itself is also an important item. The greater accelerating power of

* Other references to the same purport are:

Vol. I, p. 37, Q. 5; p. 76-7, Q. 136-143; Ex. RR, Vol. II, p. 989; Ex. PP, Vol. II, p. 988; Ex. OO, Vol. II, p. 985.

some particular substance may be utilized to reduce the *time* of the cure, or to reduce the *temperature* of the cure, or to reduce the *amount* of the accelerator employed, all three of these reductions being very desirable; or it may be utilized to permit reduction to a less degree of any two or all three of them (Vol. I, p. 532-3, Q. 9-11).

In practice, it is usual to distribute the effect of the accelerator used in a rubber batch with respect to all three of these items, *i. e.,* time, temperature and quantity. The particular way in which this is done is determined individually by every manufacturer for each one of his accelerators and each one of his various products. It is determined by a series of tests in which one factor after another is varied progressively until the results desired are obtained. Each of these tests involves vulcanizing a small piece of rubber, usually termed a "test-slab", and then testing that slab in a suitable testing machine. Every rubber factory has a laboratory equipped with vulcanizing presses and testing machines and the work of making these test-slabs with varying formulæ and testing the products goes on continually. It is done not only to develop new formulæ for new products but also to keep adequate check on production in accordance with a standard formula (Vol. I, p. 74-5, Q. 121-9; p. 77-8, Q. 143-6; p. 84, Q. 188; p. 347, Q. 41-2). This common practice should be borne in mind because so much of the work to be discussed herein involved the production of such slabs in the laboratories of rubber manufacturing companies.

For instance, the present day use of DPG as an accelerator in a rubber manufacturing plant requires the constant cooperation and supervision of a laboratory in that plant; the laboratory has to go through a series of tests for each of its various products to determine upon the formula to be used so that each product will have the particular qualities desired, for rubber products vary in quality over an exceedingly wide range, as for instance from strong inelastic automobile tires to relatively frail but highly elastic articles like inner tubes. Also, once a suitable formula is determined, the work of the laboratory in making test-slabs goes on continu-

ally by way of controlling the operation of the factory and thus maintaining the standard of the product.

For upwards of ten years prior to the patent in suit, organic substances had been in common use as accelerators, supplanting the less active inorganic substances to a large extent. The organic substances which were perhaps best known were aniline and thiocarbanilide; the latter substance is also called diphenylthiourea and it is commonly referred to as "thio". Another substance which came into wide use many years before the patent in suit is hexamethylenetetramine, usually abbreviated as "hexa". Still another organic substance which had been used to some extent is triphenylguanidine, usually called "TPG".

The Patent in Suit.

The patent in suit purports to cover the discovery that another organic substance, known for generations in the science of chemistry, is serviceable as an accelerator, and that this other substance is a better accelerator than the substances previously used. This substance is diphenylguanidine, commonly called "DPG".

The patent refers generally to the well-known vulcanization process and the common commercial use of various accelerators including TPG in the practice of that process. Then it states that DPG is a good accelerator and asserts that certain advantages are attained by its use. Then it gives a formula for a rubber compound in which DPG is the accelerator. The proportions indicated for the rubber, zinc-oxide and sulphur are usual ones; the only respect in which the process of vulcanization outlined differs from the procedure then in common commercial use is in the particular accelerator used (*i. e.* DPG); and the time of the cure is short because of the activity of DPG as an accelerator and the relatively large amount of it (2%) used.

It should be noted particularly, to avoid confusion, that the patent in suit is in no way concerned with the manufac-

ture of DPG or the cost of manufacturing it. DPG has been known as a chemical substance for generations and the text-books of chemistry have contained directions as to how to make it. This is stated to be the fact in the Weiss patent, beginning in line 31 on page 1 (Vol. II, p. 718). But no one had had occasion to make it in quantity or to consider how it could be made at low cost. This patentee, Weiss, claims to have invented a process of making DPG at low cost and has been granted another patent for his process, (Ex. QQ, Vol. II, p. 1002, side folio 297) but that is in no way concerned with the patent here in suit. Of course DPG would never have been used commercially as an accelerator if it could not have been produced in quantity at low cost; but that has no bearing in this suit for we are concerned here only with the perception and announcement that DPG, however made, is an accelerator of relatively high activity, that is, higher than the accelerators previously in use, such as TPG, hexa and thio.

The Patented Idea.

The Weiss patent in suit discloses one idea and only one. All the rest of the description in the patent is either inaccurate or only the statement of what was known to all rubber chemists. That one idea is that DPG is an accelerator of great activity, of an activity greater than TPG. It is stated in the three lines at the bottom of the first column of the first page of the patent as follows:

> "I have found that diphenylguanidine is much more powerful and efficacious as an accelerator in vulcanization than triphenylguanidine."

The accuracy of this statement that there is but this one idea disclosed in the patent should be apparent from what we have said above of the prior knowledge and prior practices of the rubber industry. Also, this same statement, in different words, was made by the Patent Office Examiner who passed upon the application for the Weiss patent, and

by the Circuit Court of Appeals of the Second Circuit in the *National* suit.

The Patent Office Examiner said, in a letter dated February 20, 1922, appearing in the File Wrapper of the Weiss patent, (Ex. H, Vol. II, p. 897) that Weiss's specification "is no more than a broad disclosure of the use" of diphenylguanidine "without disclosing any details other than that usually employed with accelerators of this class."

The Court of Appeals of the Second Circuit reviewed these Patent Office proceedings in the *National* case and expressed its agreement with the Examiner in the remark above quoted. Also, the Court said (292 Fed. 557):

> "What Weiss invented, he tells in his specification, thus,—'I have found that DPG is much more powerful and efficatious as an accelerator in vulcanization than TPG'; and nothing in plaintiff's evidence enlarges, improves or contradicts this simple statement. The claims, too, when the increment of using the phrase 'disubstituted guanidines', instead of DPG, is disregarded, mean substantially just what Weiss swore to; and the whole application might be condensed into one sentence, —'I claim the use of DPG as an accelerator, because I was the first person who observed its efficacy for that purpose."

Beyond the statement of this one idea that DPG is an active accelerator, the specification of the Weiss patent consists of general statements about the quality of the product obtained by the use of DPG, a formula for a compound containing DPG, and directions to vulcanize such a compound in accordance with the usual process of vulcanization. The formula given is one which was commonly used with various accelerators; it is not a good formula to use when DPG is the accelerator and present-day commercial practice is widely different from it. The amount of sulphur and the amount of DPG specified are both too large, as witnesses on both sides have agreed; the present commercial practice is to use about one-half of one per cent. of DPG (Vol. I, p. 78, Q. 148; p. 536, Q. 16), instead of the 2% recommended by the patent where

the formula calls for one part of DPG to fifty parts of rubber. The defendant in this case used about two-thirds of one per cent. as appears in the stipulation forming Exhibit 1 (Vol. I, p. 34).

As to the general directions given in the patent for vulcanizing the mixture compounded in accordance with the formula stated, these differ in no respect from the standard practice of many years past; no one has ever suggested that they involved any novelty.

As to the assertion of improved physical properties of the product obtained, these are in accord with the known general principle above discussed, namely, that a superior product results from the use of an accelerator, or a more active accelerator, because then the time during which the mixture is subjected to the vulcanizing heat is reduced. When these assertions are considered specifically as they are stated in the patent, they amount to nothing more than reiteration that DPG is an active accelerator, and that, generally speaking, higher activity of the accelerator makes better rubber products.

It must be evident, therefore, that the patent contains nothing that purports to be a disclosure of a novel idea beyond the statement that DPG is a superior accelerator, that is, the statement at the bottom of the first column of the patent reading:

> "I have found that diphenylguanidine is much more powerful and efficacious as an accelerator in vulcanization than triphenylguanidine".

As stated by the Second Circuit Court of Appeals, in the *National* case, the whole patent could be expressed in one sentence reading (292 Fed. 557):

> "I claim the use of diphenylguanidine as an accelerator because I was the first person to observe its efficacy for that purpose."

Having thus fixed definitely the asserted novelty of the Weiss patent in suit, the defenses heretofore stated may be discussed in detail.

FIRST DEFENSE.

The Weiss patent is invalid because of publication of the invention in the Kratz paper, plaintiff's effort to prove prior invention by Weiss having failed.

The Kratz Paper.

This paper was the joint production of Messrs. Kratz, Flower and Coolidge, employees of the Falls Rubber Company, a rubber manufacturing company located at Cuyahoga Falls, near Akron, Ohio. It was read by Dr. Kratz before the Rubber Division of the American Chemical Society at a meeting held at Philadelphia from September 2 to 6, 1919. An abstract of the paper appeared in an issue of *Chemical and Metallurgical Engineering* published shortly after November 11, 1919, (Ex. K, Vol. II, p. 919) and the complete paper was first published in April, 1920, in the *Journal of Industrial and Engineering Chemistry* (Ex. E, Vol. II, pp. 825-844).

Dr. Kratz had been identified with the chemistry of rubber and the use of accelerators in rubber manufacture for over seven years prior to the reading of the paper, with the Diamond, Goodrich and Norwalk companies, and, after April, 1917, with the Falls Rubber Company. The general subject of vulcanization was one to which he had directed his efforts almost exclusively for years, and he was intimately familiar with commercial practice in the use of accelerators.

The paper was recognized at the time of the Philadelphia meeting as of great value and importance; the audience consisted of the leading rubber chemists of the country, representing practically all of the rubber manufacturing companies, and many of them took notes of data presented by Dr. Kratz (Vol. I, p. 216, Q. 91-4; p. 532, Q. 6-7; p. 651, Q. 11-19; and Vol. II, p. 1018, Q. 3; p. 1023, Q. 4-5). In particular,

Tables I and II of the paper were written out upon a blackboard by Dr. Kratz, and the information covered by the tables was copied by many of those in the audience (Vol. I, p. 652, Q. 18-19; p. 213, Q. 73-4; and Vol. II, p. 1023-4, Q. 6-9).

The title of the paper is

"THE ACTION OF CERTAIN ORGANIC ACCELERATORS IN THE VULCANIZATION OF RUBBER."

After some preliminary discussion of the use of accelerators and the information on the subject available in the literature, the authors discussed their "own experience", leading up to the following (Vol. II, p. 830):

> "For example, in our preliminary experiments we found that urea was slightly more active than thiourea. Thiourea, in turn, was more active than monophenylthiourea, and the latter more active than diphenylthiourea. **The same was true in the case of the guanidines, both monophenylguanidine and diphenylguanidine being found more active than triphenylguanidine,** although the conditions of our experiment did not permit of a differentiation between the two substances first mentioned * * * In the case of the guanidines, **the great difference in activities of mono- and diphenylguanidines, when compared with that of triphenylguanidine,** may be attributed to the fact that in the latter substance the phenyl group has replaced imido rather than amido hydrogen." (Emphasis ours.)

Then, under the heading "Experimental Part", the procedure followed in carrying out the investigation is set forth in detail, including the kind of rubber used, the proportions of rubber and sulphur in the mixture, the manner in which the accelerator was incorporated and the method of vulcanizing. The data given is entirely sufficient to enable any rubber chemist to repeat just what was done; it is more specific and in greater detail than that given in the Weiss patent.

The description of the procedure employed and the results obtained reads, in part, as follows (Vol. II, p. 836-8):

> "The rubber used was good quality, first latex, pale crepe, and the same lot was employed in all mixtures.

All mixtures were made under standard conditions; the average time of each batch on the mill was 17.5 min. The same proportion of rubber and sulphur—92.5 parts rubber, and 7.5 parts sulphur—was employed in each instance, but the amount of accelerator was varied, according to the conditions of the experiment.

All of the accelerators soluble in alcohol were dissolved in the smallest quantity of this liquid and introduced into the rubber in solution. Those not soluble—and this applied to the anhydro-formaldehyde bodies only—were ground to 100 mesh and added to the rubber with the sulphur. After mixing, the mixtures were allowed a recovery period of 24 hours before they were vulcanized. Vulcanization was carried on in a platen press of the usual type.

* * * * * *

TABLE 1—RELATIVE ACTIVITIES—
THIOUREA SERIES

Parts Required to Equal One Part Aniline

Aniline	1.000
Urea	0.250
Thiourea	0.300
Monophenylthiourea	0.450
Diphenylthiourea	0.850
Monophenylguanidine (*a*)	0.075
Diphenylguanidine (Sym)	**0.075**
Triphenylguanidine	0.500

The activities of the various substances were compared in the mixture previously mentioned—92.5 parts of rubber and 7.5 parts of sulphur—taking as a standard the effect obtained with one part of aniline, vulcanized for 90 min. at 148° C. The amounts of various substances in the urea series required to effect the same degree of vulcanization as obtained with one part of aniline are shown in Table I." (Emphasis ours.)

In view of these quoted statements, the Kratz paper must be held to be a disclosure of the value of diphenylguanidine as an accelerator, a disclosure extending far beyond that contained in the Weiss patent. The paper states:

"both monophenylguanidine and diphenylguanidine being found more active than triphenylguanidine"

and refers to

> "the great difference in activities of mono- and diphenylguanidines when compared with that of triphenylguanidine."

Not only does the paper state that DPG is an accelerator of greater activity than TPG, but it gives figures representing the degree of the greater activity of the one over the other. Thus, the table of "Parts Required to Equal One Part Aniline" includes

Diphenylguanidine	0.075
Triphenylguanidine	0.500

which is a definite statement that 0.075 parts of diphenylguanidine would have as great an accelerating value as 0.500 parts of triphenylguanidine, or in other words, that DPG has about seven times the activity of TPG. This comparison of DPG with TPG is identically the same comparison that is used in the Weiss patent in disclosing the invention which the patent purports to cover; see particularly the sentence in lines 52 to 55 on page 1 (Vol. II, p. 718).

One of the expert witnesses testified that Tables I and II of the paper express the relative activity of the accelerators named by a method of comparison which is quite usual, in fact one of the two most commonly employed for the purpose (Vol. I, p. 532, Q. 8). These are the tables which were copied on the blackboard by Dr. Kratz. Table I is the table above quoted which includes DPG and TPG.

Plaintiff's expert, Dr. Whitby, paid a fitting tribute to the paper. He said he first learned that DPG was an accelerator from an abstract of the paper, and that the paper was the earliest he knew of relating to the use of DPG as an accelerator. Also, he is the author of a book on rubber in which, under a heading "Natural and Artificial Accelerators", he mentions "guanidine derivatives" and refers to this paper of Kratz, Flower and Coolidge as a source of information on the subject (Vol. I, p. 53-4, Q. 21-27; p. 67-8, Q. 85-6).

Defendant's witness, Shepard, Director of Organic Re-

search for the Firestone Tire & Rubber Company, testifying about the Kratz paper, said (Vol. II, p. 1024, Q. 14):

> "This paper was the first paper which gave us any definite idea of the relative activity of accelerators and as such was an extremely important paper, because having these relative activities we were enabled to apply the various accelerators sensibly."

Plaintiff's witness Daniels attended the Philadelphia meeting and heard Dr. Kratz read this paper; he said he had never heard a paper on accelerators so interesting as this one, nor a paper that gave as definite information (Vol. I, p. 216, Q. 92-95). Also, he said the paper stated the greater activity of DPG as compared with TPG and that the greater activity of DPG was shown by the matter which Dr. Kratz printed upon the blackboard in front of the audience (Vol. I, p. 215, Q. 83-4).

Furthermore, the sufficiency of the Kratz paper as a disclosure of the accelerating value of DPG finds most unusual confirmation in the conduct of Weiss himself. Weiss was employed up to March 15, 1920, by the Republic Rubber Company at Youngstown, Ohio, and on that date was dismissed from its employ. At that time, Weiss was married, had an infant child, and had little or no funds; the need for finding employment was compelling (Vol. I, p. 129, Q. 158; p. 157, Q. 324-5). With the necessities of that situation guiding his action, Weiss applied for employment with practically all the rubber companies in the Akron district (Vol. I, p. 128, Q. 153), and in doing so, of course it was only the most natural thing for him to dilate upon every achievement in the chemistry of rubber to which he could make any claim. What he did do was to refer repeatedly to Dr. Kratz's paper as showing the value of DPG as an accelerator and to claim as his own contribution only a process of making DPG in quantity.

Immediately after his dismissal from the Republic Company, Weiss applied to the Firestone Company for employment and was required to make out an application on a printed form provided by the Company (Vol. I, p. 157, Q.

321). The original of this application as written out by Weiss is Exhibit C herein (Vol. II, p. 823-4). In this application, Weiss himself wrote:

> "I have lately developed a process for the commercial production of symmetrical diphenylguanidine. The value of this product as an accelerator has been discussed by Dr. Kratz at the Phila. meeting of the Am. Chem. Soc. and taking aniline as a basis he has shown that .08% of this product is equivalent to 1% of aniline."

Weiss wrote this before the publication of the paper in print in April, 1920; this information came to him from Daniels who heard Kratz present the paper orally (Vol. I, p. 155-7, Q. 315-8; p. 218, Q. 103).

Also, Weiss wrote in this application that his laboratory tests showed that one part of DPG was equivalent to four parts of thio and to one and one-half parts of hexa and he testified that the mere statement of these ratios of equivalency would suffice to disclose the greater activity of DPG (Vol. I, p. 158, Q. 329). This emphasizes the sufficiency of the Kratz paper which expresses relative activity in the same way.

At the time of applying to the Firestone Company for employment, Weiss interviewed Shepard, and the latter testified (Vol. II, p. 1029, Q. 69) that Weiss then stated to him:

> "Of course, you know that diphenylguanidine is a good accelerator from what you have heard at the Philadelphia meeting."

What Shepard heard at the Philadelphia meeting was the paper read by Dr. Kratz; Shepard was one of the many persons present who took notes of what Dr. Kratz said and the tables he displayed on the blackboard (Vol. II, p. 1023-4, Q. 4-9).

In the course of this interview with Shepard, Weiss told in detail of the process of making DPG which he claimed to have invented, but, though there was such excellent reason why he should tell of all his accomplishments in the chemistry of rubber, Weiss never intimated that it was he who had dis-

covered the activity of DPG as an accelerator. Shepard said:

> "He made no mention of having discovered this material as an accelerator. In fact he ascribed the discovery to Mr. Kratz" (Vol. II, p. 1025, Q. 28; Vol. I, p. 159-161, Q. 336-346).

Later, Weiss applied to the National Aniline and Chemical Company for employment, and again he referred to the paper read by Dr. Kratz as showing the value of DPG as an accelerator. The formal application to the National Company is Exhibit B herein (Vol. II, p. 821-2). At that time also Weiss made no claim that he originated the idea of using DPG as an accelerator (Vol. I, p. 162, Q. 352; Vol. II, p. 1015, Q. 19).

Still later, Weiss approached Doty and Woodward, and once more referred to the activity of diphenylguanidine as one and one-half times as active as hexa and four times as active as thio, expecting them to understand from this that it was a superior accelerator (Vol. I, p. 164, Q. 362-4). In other words, he used the same method of comparison as that employed by Dr. Kratz in his paper to show the higher accelerating value of DPG.

Finally, when the application for the patent in suit was pending before the Patent Office, it was rejected in view of the disclosure in Dr. Kratz's paper which by that time had been published in a periodical, and the Patent Office Examiner said, in connection with this rejection (Ex. H, Vol. II, p. 895):

> "Applicant's disclosures of the use of said accelerator are not more specific than disclosed in the publication, hence the rejection."

In accordance with Patent Office procedure, the Examiner was required to address a letter on the subject to the Commissioner of Patents, and in the letter he said (Ex. H, Vol. II, p. 897), referring to the Kratz paper:

> "The publication is a clear disclosure of the use of di- and triphenylguanidine as an accelerator broadly,

> and as applicant's specification is no more than a broad disclosure of the use of the same reagent without disclosing any details other than that usually employed with accelerators of this class, it is considered that the publication constitutes a reference for the claims."

In reply to this rejection, there was no criticism whatever of the sufficiency of the paper as a disclosure of all that was contained in the Weiss application. Instead, affidavits were submitted attempting to establish an earlier date for Weiss. This constitutes an admission that the disclosure in the Kratz paper covered all that was claimed by the applicant and that the rejection was a proper one. Thus, in a similar situation, the Commissioner of Patents said:

> "The filing of the affidavit under the provisions of Rule 74 (now Rule 75) indicates that he concedes the pertinency of the references, and is now seeking a patent on the ground that his own invention was prior in point of time." (*Ex parte Saunders, 1883 C. D. 23, 24.*)

The Court of Appeals for the Second Circuit in the *National* case, summarized the situation as follows (292 Fed. 558):

> "The quotation above made from the file-wrapper contents is part of what the Examiner said, when he confronted Weiss' solicitors with the publication of Kratz's essay. Their reply was, not to call attention to the date of publication and rely on R. S. 4886; there was obvious recognition of the truth of the Examiner's criticism, and Weiss fell to affidavit making (under Office Rule 75), and carrying back his date of invention, so as to antedate Kratz's reading of his essay. The reason, and the only reason, for this is that Kratz by that essay proclaimed himself and his associates as having observed that D. P. G. was a better accelerator than T. P. G., *inter alia,* and this, as we have pointed out, and as the Examiner in substance said, was and is the sum total of this invention."

Plaintiff has asserted that the Kratz paper is insufficient as a disclosure of Weiss's invention because, while it states specifically that DPG is a far more active accelerator than TPG, it does not state that a superior rubber product is produced by the use of DPG. It was unnecessary to state that.

All of the rubber chemists who heard the paper knew it. One of the primary functions of an accelerator is and always has been to improve the quality of the rubber product and it is a general rule that the greater the activity of the accelerator the better the quality of the rubber. Carlton, a witness for plaintiff, said this was taught in the colleges ten years ago, and defendant's witness Sanderson explained why it was so, and numerous writers have commented on the improvement of rubber products by reason of the use of better accelerators (*ante*, p. 11-12). Furthermore, plaintiff claims that Weiss made the invention prior to the Kratz paper, and plaintiff's witness Daniels said he told Weiss, on his return from the Philadelphia meeting, that Kratz's paper showed the same result Weiss had gotten (Vol. I, p. 218, Q. 105), though it made no direct statement about the quality of the rubber, assuming that all present knew the basic general principle that better accelerators produced better rubber.

Labored attempts were made in the rebuttal proofs by the witnesses Williams and Whitby to criticize the Kratz paper but the comments of those two witnesses are too erratic and inconsequential to make specific reply worth while. If there were, (contrary to our belief,) some sound basis for criticism of Dr. Kratz' *conclusions* on debatable chemical theories and the reasoning by which he arrived at those conclusions, there would still remain untouched the direct and positive statement of fact made by Dr. Kratz to the assembled rubber chemists that DPG is an accelerator of greater activity than TPG, which is just what Weiss said and the only thing of any consequence in his patent. No amount of criticism can take from the Kratz paper the statement that DPG is "more active than TPG". That is what Dr. Kratz told the rubber chemists and that is one of the items they noted and took back home with them, just as Daniels noted it and took it back home to Weiss (Vol. I, p. 217-8, Q. 102-9). As to the formula Kratz used, it is set out in full in his Norwalk report and in his paper; Kratz said it was an old formula he had used for years before and after

his Norwalk work (Vol. I, p. 350, Q. 54), and he said time and again that he made slabs of rubber with this formula, using DPG as the accelerator. (Vol. I, p. 346, Q. 39; p. 350, Q. 53; p. 351-2, Q. 63; p. 353, Q. 68). It was unnecessary for defendant to go further with proof of the practical value of rubber made by this formula with DPG as the accelerator, because Weiss wrote in his Firestone application back in 1920 that his "laboratory tests" substantiated just what Kratz said (Vol. II, p. 824).

Plaintiff's witness Williams verified the accuracy of all those statements in the Kratz paper which are of importance in this litigation; he said that "if a tire manufacturer used diphenylguanidine as his accelerator, he would be able to produce a very superior article by using a low per cent. of diphenylguanidine and curing for a fairly long period at a low temperature" (Vol. I, p. 665) and that is precisely the operation described in the Kratz paper. Williams said the accelerating strength of monophenylguanidine and diphenylguanidine are "nearly the same" (Vol. I, p. 658, Q. 33) and that is precisely the relation stated in the Kratz paper. Williams referred to diphenylguanidine as having eight times the accelerating strength of tri-phenylguanidine (Vol. I, p. 666, Q. 53) and this again is precisely the relation stated in the Kratz paper.

Also, Williams indulged in some extravagant assertions based on *ex parte* tests as to which but few of the conditions are stated, which recall that when one "undertakes to prove that his adversary's process or machine is a failure, he always scores a success" (83 Fed. 696). If one wanted to score a failure, there is no art where that could be done with greater facility than in vulcanization.

As to all respects of importance in which Dr. Whitby criticised the Kratz paper, (Vol. I, p. 674, Q. 194-5) he put himself in direct conflict with Williams. Dr. Whitby, like Williams, gained his first knowledge of DPG from the Kratz paper, and in his book on rubber he refers to the Kratz paper as one of the authorities on the subject of accelerators (Vol. I, p. 53-4, Q. 21-6).

The proper estimate of the Kratz paper is given by plaintiff's witness Daniels and defendant's witness Shepard.

Daniels said he never before heard so interesting a paper on accelerators nor had he ever heard a paper which gave such definite information (Vol. I, p. 216, Qs. 93-4) and that in the course of the paper it was stated that DPG was more active than TPG and that this fact was shown by the matter posted on the board which Daniels copied and took back to Weiss (Vol. I, p. 214-5, Q. 78-84).

Dr. Kratz not only stated that DPG was a good accelerator and a more active one than TPG but also he stated definitely in figures how much better it was. His table included, in addition to DPG and TPG, two accelerators with which all rubber chemists were familiar, namely, aniline and thio (diphenylthiourea) and the figures told how much of DPG one would have to use to get the same accelerating effect as with given amounts of aniline and thio. This is perhaps the most serviceable method of indicating accelerating value; in any event it is one which cannot be criticised by plaintiff for Weiss used the same method in his application for employment at Firestone when he said his tests showed that one part of DPG "is equivalent to 4 parts of thiocarbanilide and 1½ parts of hexamethylenetetramine" (Ex. C, Vol. II, pp. 823-4). Again Weiss used this same method when he sought to convince Doty and Woodward of the Dovan Company that they should undertake to exploit DPG (Vol. I, p. 164, Q. 362-4).

So it is clear beyond all question that the Kratz paper is a full disclosure of the one idea disclosed in the Weiss patent. Tributes to its sufficiency came from all sides, including from Weiss himself. Also, the District Court in this case said in its opinion that in his paper Dr. Kratz

> "fully disclosed the subject-matter of the Weiss patent, more fully, indeed, than does the patent" (Vol. I, pp. 691-2).

Also, that is the conclusion reached by the Court of Appeals of the Second Circuit in the *National* suit, wherein that Court said (292 Fed. 558):

> "We hold that essay to be a complete disclosure of everything in the application for the patent in suit, and of a great deal more useful and accurately stated information."

This leads to a consideration of how the patent in suit came to be granted notwithstanding the reading and publication of the Kratz paper long before the application for the patent was filed.

File Wrapper of the Patent in Suit.

The application for the patent in suit was filed on November 12, 1921, *more than two years* after the Kratz paper was read on September 2-6, 1919, and *more than two years* after knowledge of the contents of that paper had been conveyed to Weiss by Daniels, and *nearly two years* after the Kratz paper had been abstracted in the technical press, and *more than a year and a half* after the paper had been published in full and widely distributed.

On December 29, 1921, the application was rejected (Ex. H, Vol. II, p. 861) in view of a brief and general reference to the use of DPG as an accelerator in an article published in the *India Rubber World*. That article was published on May 1, 1921, but it states that the article was read at a meeting of the American Chemical Society in Chicago on September 6-10, 1920. In reply to this rejection, brief affidavits of Weiss and one of his associates were filed for the purpose of establishing for Weiss a date of invention prior to September 6, 1920.

Then under date of January 13, 1922, the Examiner again rejected the application on the ground that the affidavits submitted were not sufficient. The Examiner's comment was (Ex. H, Vol. II, p. 868):

> "Merely stating that the invention was disclosed to others before Sept. 6, 1920, and reduced to practice—does not bring out *all* the facts in applicant's possession. To *whom* was it *disclosed* and when? When was it placed on the market and *where?* There must be a *completion* of the invention in this country before the date of the reference. Furthermore, a public address before the American Chemical Society disclosing completely the invention on Sept. 6, 1920, shows *knowledge* which applicant must overcome by bringing his dates back of Sept. 6, 1920."

Again Weiss replied with affidavits of himself and his business associates (Ex. H, Vol. II, p. 871-891). This time the Examiner concluded that the affidavits were sufficient to establish for Weiss a date prior to September 6, 1920, and accordingly the application was allowed on Feb. 15, 1922 (Vol. II, p. 892). Immediately thereafter, on February 20, 1922, the Kratz paper came to the Examiner's attention. This led him to write a letter to the Commissioner of Patents (Vol. II, p. 896-7) and also a letter of rejection (Vol. II, p. 895), and in those letters the Examiner made the statements, heretofore quoted (*ante*, p. 24-5) to the effect that the Kratz paper contained quite as full a disclosure of the use of DPG as an accelerator as the Weiss application, which, the Examiner said, was "no more than a broad disclosure" of the use of DPG "without disclosing any details other than that usually employed with accelerators of this class".

Again, Weiss resorted to affidavits, this time to establish a date of invention prior to September, 1919, when the Kratz paper was read (Vol. II, p. 902-910). Five affidavits were filed, based solely on the recollection of the affiants as to events which were then over three years old. They were accepted by the Examiner and no further objection to the application was made.

This procedure of filing affidavits to antedate a prior publication is covered by a rule and established procedure of the Patent Office, as is shown by the following extract from an opinion in a case decided by the Patent Office:

> "The rule requires that an applicant, having been rejected upon reference to some prior patent or printed publication, shall make oath to *facts* showing a completion of the invention by him before a certain date, as distinguished from a mere statement of his opinion that he has made such an invention. *Ex parte* Gasser, 17 O. G., 507. The affidavit should detail, therefore, the facts and circumstances upon which the applicant bases his claim of invention. * * *
>
> The prior patent or the printed publication affords to the public an adequate knowledge of the invention, and dedicates it to the public use. If the invention is to be reclaimed for the private use of the applicant, he should

show that he had before that time completed the invention and disclosed information of the same to others as full, accurate and exact as that afforded by the patent or publication, and also, that he has since preserved his right to a patent by a diligent prosecution of the same. No patent will hereafter be granted, therefore, for inventions disclosed in prior patents or publications until the applicant shows by exhibits or descriptions properly verified by oath that the invention was made and completed by him in a patentable sense before the date of the application upon which the patent was granted or before the date at which the printed publication was made." *Ex parte Saunders, 1883 C. D., 23.*

The showing made for Weiss in the affidavits filed was so meagre and insufficient that the Examiner should not have allowed the application, particularly so because the affidavits were unsupported by any document contemporaneous in date with the events covered by the affidavits. Weiss said in his final affidavit that DPG "was produced and actually used in the vulcanization of rubber goods during the early part of the year 1919" and Daniels said:

> "These tests were also carried out in the compounding laboratory for the various departments of the Republic Rubber Company at Youngstown, Ohio, and the accelerator proved to be highly efficient as an accelerator in the actual vulcanization of rubber goods, such as hose, tires, belts, valves and other mechanical goods."

The Examiner should have refused to accept these affidavits as sufficient in the absence of documents dated in 1919 and showing beyond question that the rubber goods were made and that the accelerator was used in them and proved to be efficient.

But we are not concerned with whether or not the Patent Office rule was properly enforced. What is of importance is that the patent was granted on a misrepresentation of the facts. Both Weiss and Daniels testified at the trial and their testimony makes it clear that the statements in their affidavits were without justification.

The only "rubber goods" which Weiss claims to have made "during the early part of the year 1919" were small test-slabs,

like Exhibit TT, and the only dated records of such test-slabs are three entries in the record book (Ex. 10, Vol. II, p. 725-769) of the laboratory of the Republic Rubber Company where Weiss was employed. Of these three, one has had its date changed and the other two relate to tests on shoddy (re-claimed rubber) compounds which do not indicate any superiority of DPG over TPG.

As to the Daniels affidavit, (Vol. II, p. 909-10), it states that such rubber goods as hose, tires, etc., were actually made at the Republic Plant in the early part of 1919 by the use of DPG, and nothing of that sort occurred in that year or at any other time while Weiss was with the Republic Company (Vol. I, p. 146-7, Q. 257-262). Plaintiff's only answer to this is that the Patent Office Examiner could not have understood this statement to mean what it says because, if the articles named had been made by the use of DPG in the early part of 1919, that in itself would have constituted a public use of the invention which would invalidate the patent. That does not follow at all. Even if all the articles named by Daniels had been made by the Republic Company in the early part of 1919 by the use of DPG in the course of developing and perfecting the use of DPG in such manufacture, that would not necessarily have any effect upon the validity of the patent. The validity of the patent could be affected by work of Weiss himself and the Republic Company where he was employed only if the work developed into commercial manufacture and *actual sale* more than two years before the application for the patent was filed. Nothing short of *public use* or *public sale* more than two years before applying for the patent constitutes a statutory bar. So there is no reason why the Patent Office Examiner should not have understood the affidavit to mean precisely what it says, and what it says is false. No such articles were made at the Republic Company with DPG in 1919 or at any other time while Weiss and Daniels were there.

It is evident, therefore, that the grant of the Weiss patent was secured by misrepresentation of the facts in *ex parte* affidavits. The Court of Appeals in the *National* case held this

to be the fact, saying that Weiss' testimony "is not wholly reconcilable with some of the affidavits used in the (Patent) Office" and the District Court in this case said that the affidavits submitted to the Patent Office were such as to "create a false impression" (Vol. I, p. 695). Now, however, the facts are brought out fully in the testimony and exhibits in this suit.

On the basis of these facts, we submit that the situation presented sustains three propositions, and that adoption of any one of the three requires rejection of this plaintiff's claim, namely:

1. The District Court held that "Weiss' testimony in the instant case shows various contradictions of statements made in prior steps in the case, some in regard to material matters" and that "the circumstances, as well as our observation of the witnesses, preclude us from giving great weight in the attempt to fix Weiss' discovery of DPG as prior to Kratz's disclosure" (Vol. I, p. 696); and it is an established rule of this Court and all other appellate courts that when the trial court has made a definite ruling as to the credibility of the witnesses produced before the court, that ruling will be adopted by the appellate court in the absence of manifest error.

This established rule of appellate courts should be considered in conjunction with the equally definite rule that a plaintiff attempting to establish an early date of invention for the patentee of the patent in suit in order to antedate an anticipation, can do so only by producing evidence proving the early date beyond all reasonable doubt. In the absence of palpable error on the part of the trial judge, the testimony offered by the plaintiff cannot properly be held to establish the claimed date *beyond all reasonable doubt* when it is a fact that the trial judge found plaintiff's testimony to contain various contradictions in material matters and not to be entitled to great weight.

2. If this Court shall consider plaintiff's testimony anew, the discrepancies, contradictions and misrepresentations ap-

pearing in it will be found to be so numerous and so substantial as to fully sustain the conclusion reached by the trial Judge.

3. If all parts of plaintiff's testimony which are supported by a contemporaneous record be accepted at their face value and subject to no depreciation on account of discrepancies, still it is necessary to conclude that all Weiss did prior to the reading of the Kratz paper was inconclusive, and "merely experimental and guided by no principle" and that it taught him nothing of any value about the use of DPG as an accelerator or its superior activity over TPG or any other accelerator.

These three propositions will now be discussed individually:

1. Adopting the trial Court's ruling.

In its opinion in this case, the trial Court discussed at length the evidence presented by plaintiff to establish the early date of invention claimed for Weiss. This discusison appears on pages 691 to 696 of Vol. I of the record. The date of the most important record presented by Weiss has been changed, as all agree, and the Court held that the change was from a date subsequent to the Kratz paper to a date prior thereto. As to another part of Weiss's testimony, the Court held "it is impossible to accept his testimony in this respect". Also, an affidavit made by Weiss' principal corroborating witness was quoted and then the Court said "The manifest effect of the immediately foregoing was, at best, to create a false impression". Then the Court pointed out that this witness stated in his testimony that certain tests were made subsequent to the Kratz paper, whereas he had previously executed an affidavit that the same tests were made before the Kratz paper. Then the Court commented on the various contradictions in material matters in Weiss's testimony. Finally, the Court held that the circumstances and the Court's "observation of the witnesses" made it impossible to sustain the plaintiff's claim to the early date of invention.

This situation calls for application of the rule, established in the following cases, that in the absence of manifest error

an appellate court will not go behind a ruling of the trial court on such an issue as credibility of witnesses; that ruling is to be "treated as unassailable".

Adamson vs. *Gilliland,* 242 U. S. 350.
Davis vs. *Schwartz,* 155 U. S. 631.
Kimberly vs. *Arms,* 129 U. S. 512-525.
Mason vs. *U. S.,* 260 U. S. 545.
Tilghman vs. *Proctor,* 125 U. S. 136-149.
Cramer vs. *U. S.,* 261 U. S. 219.
Lawson vs. *U. S. Mining Co.,* 207 U. S. 1.

The particularly pertinent statement of this Court in *Davis* vs. *Schwartz* (p. 636), quoted and applied in *Adamson* vs. *Gilliland,* is:

> "so far as it (the lower Court's ruling) depends upon conflicting testimony, or upon the credibility of witnesses, or so far as there is any testimony consistent with the finding, it must be treated as unassailable" (Cases cited).

It is no argument against the application of this rule that the Court of Appeals reversed the ruling of the District Court. Several reasons support that view. In *Adamson* vs. *Gilliland,* the Court of Appeals for the Eighth Circuit had reversed a decree of a Missouri District Court, and nevertheless this Court applied the rule above set forth, which, of course, is founded upon the superior position of the trial Judge in that he heard the witnesses and saw how they conducted themselves. Furthermore, the Court of Appeals committed an error in this case in not applying the rule above stated.* Finally, the Court of Appeals gave no statement of its reasons for not agreeing with and adopting the conclusion of the trial Judge as to the credibility of these witnesses.

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* See *Kimberly* vs. *Arms,* 129 U. S. 512, where this Court said at page 525:

> "We are, therefore, constrained to hold that the learned court below failed to give to the findings of the Master the weight to which they were entitled, and that they should have been treated as so far correct and binding as not to be disturbed, unless clearly in conflict with the weight of the evidence upon which they were made."

We maintain, therefore, that under the doctrine of *Adamson* vs. *Gilliland*, the ruling of the District Court on the credibility of plaintiff's witnesses on this all-important issue of plaintiff's date of invention, should be considered as unassailable, for certainly it is not manifestly wrong; and if that be done, the whole of plaintiff's case falls.

This proposition assumes even greater strength when considered in conjunction with the heavy burden of proof which a plaintiff must in any event carry when it undertakes to prove an early date of invention to antedate what would otherwise be an anticipation. For generations back the Courts which pass upon patent litigations have been applying the rule that when a plaintiff seeks to avoid the effect of an anticipation by proving that the patentee of the patent in suit made his invention before the effective date of the anticipation, he must establish his claim to the early date by evidence which eliminates all reasonable doubt. The principle involved is identical with that applying to proof of a prior use, which, under *The Barbed Wire Patent*, 143 U. S. 275, *Deering* vs. *Harvester Works* (*post*, p. 54) and similar decisions, is required to eliminate all reasonable doubt. In *Clark Thread Co.* vs. *Willimantic Linen Co.*, 140 U. S. 481, 489, this Court rejected the plaintiff's claim to a certain date of invention, saying:

> "Such testimony, given for the purpose that this was, is necessarily subject to the gravest suspicion, however honest and well intentioned the witness may be".

And in *Loom Co.* vs. *Higgins*, 105 U. S. 580, where the plaintiff offered testimony to prove the date of invention of the patent in suit in order to establish priority, this Court pointed out at page 594 that such testimony must be "received with caution".

The rule based on these decisions of this Court has been stated and applied by the lower courts in innumerable instances, among which are the following:

> "One who seeks to carry the date of invention back of a date of an anticipating patent assumes the burden of proof, and must establish the earlier date by evidence

so cogent as to leave no reasonable doubt in the minds of the Court that the transaction occurred substantially as stated. *Moline Rock Plow Co.* vs. *Rock Island Plow Co.*, 212 Fed., 727, 129 C. C. A. 337. The rule as to the burden cast upon the appellee in endeavoring to fix such a date is very strict. It is so easy to fabricate or color evidence of prior invention, and so difficult to contradict it, that proof has been required which does not admit of reasonable doubt."

Barber vs. *Otis Sales Co.*, 271 Fed. 171, 180, C. C. A. 2nd Cir.

"This date (of defendant's prior invention) being fixed, the burden was transferred to the complainant to satisfy the court by proof as convincing as that required of the defendant that his invention preceded theirs. The rule in such cases is very strict. It is so easy to fabricate or color evidence of prior invention and so difficult to contradict it, that proof has been required which does not admit of reasonable doubt. Where interests so vital are at stake, where intervening years have made perfect accuracy well nigh impossible, where an event, not deemed important at the time, has been crowded from the memory and obscured by the ever varying incidents of an active life, it is not difficult to imagine that even an honest man may be led erroneously to persuade himself that the fact accords with his inclination concerning it.

"The evidence of prior invention is usually entirely within the control of the party asserting it, and so wide is the opportunity for deception, artifice, or mistake, that the authorities are almost unanimous in holding that it must be established by proof clear, positive and unequivocal; nothing must be left to speculation or conjecture."

Thayer v. *Hart*, 20 Fed. 693, C. C., S. D. N. Y.

See also:

Westinghouse, etc., Co. vs. *Catskill, etc., Co.*, 121 Fed. 831.

New England Motor Co. vs. *Sturtevant Co.*, 150 Fed. 131, 137, C. C. A., 2d Cir.

Wendell vs. *Amer. Laundry Co.*, 248 Fed. 698, C. C. A., 3d Cir.

Thacher vs. *Board of Supervisors,* 235 Fed. 724, 725.

Columbus Chain Co. vs. *Standard Chain Co.,* 148 Fed. 622, 629, C. C. A., 6th Cir.

As stated in the *Westinghouse* case quoted by Judge Lacombe in the *New England Motor Co.* case, a patentee who seeks to establish an earlier date of invention must "furnish the Court with convincing proof that the anticipation has been anticipated."

Thus it is a rule that has governed the decision of patent litigations for generations past that a plaintiff can be given the benefit of a date of invention prior to an anticipation only when the evidence proves the early date beyond all reasonable doubt. And manifestly, the greater the period of unexplained delay after alleged completion of the invention and before applying for patent, the stronger must the evidence of the early date of invention be. In this instance the delay after the claimed completion of the invention and before filing the application for the patent in suit is a matter of years. Plaintiff claims it has proven a date of invention for Weiss in March, 1918, or February, 1919, or some time between those dates, and Weiss's application for the patent in suit was not filed until November, 1921. So the period of delay is from two and two-thirds to three and one-half years.

This rule of evidence and the conclusion of the trial court should be considered together, and when so considered, we think they warrant dismissal of plaintiff's claim without detailed examination of the evidence submitted in proof of the alleged early date of invention. When the law requires proof beyond all reasonable doubt and the trial judge who had the great advantage of hearing and seeing the witnesses refused to accept their testimony because of contradictions on material points, the requirement as to the evidence necessary to establish the claim is not fulfilled, for some doubt which is entirely reasonable must still remain.

2. Credibility of Weiss and his corroborating witnesses.

If the evidence submitted by plaintiff in support of its claim to a date of invention prior to the Kratz paper be subjected to independent examination, it will be found that the trial Court was entirely correct in holding that it discloses various contradictions of statements on material points and is not worthy of acceptance.

Weiss claims that he conceived the idea of using DPG as an accelerator in March, 1918. At that time he was in the employ of the Republic Rubber Company at Youngstown, Ohio, as a chemist. He had been employed there since October, 1917, and prior to that he had had no experience in the chemistry of rubber. His immediate superior was C. A. Carlton, a witness for plaintiff. Carlton had been particularly interested in the use of guanidine derivatives as accelerators and had used TPG (Vol. I, p. 92-3, Q. 16) and he discussed the use of these substances as accelerators with Weiss.

In the course of one of these talks, Weiss produced a copy of Richter's Organic Chemistry, a standard chemical handbook, and opened it to the page for the phenylated guanidine derivatives. There he found triphenylguanidine and the usual dictionary data with reference to it, and immediately next to it was diphenylguanidine with the corresponding data about that, for it must be understood that DPG has been a known substance for generations past. Seeing this data about DPG and knowing that TPG was an accelerator, led Weiss to suggest that possibly DPG would be an accelerator too and that it would be well to try it, with which suggestion Carlton agreed (Vol. I, p. 93, Q. 16; p. 95, Q. 27-9).

This is all there is to the allegation of conception of this idea in the early months of 1918. It depends entirely upon recollection of what is said to have occurred seven years prior to the trial. Also, in connection with this, it is well to have in mind some facts about Carlton bearing on his credibility. In the *National* suit there was a motion for preliminary

injunction and Carlton made an affidavit in behalf of *defendant,* in which he said (Vol. II, p. 1003):

> "When Morris L. Weiss came into the employ of the Republic Rubber Company I was doing research work on the guanidines and had developed TPG. When preparing to leave the employ of the Republic Rubber Company I directed and advised the said Morris L. Weiss to proceed with research work on the phenylated guanidine derivatives, including monophenylguanidine and diphenylguanidine as well as the guanidine bases."

Very soon thereafter Carlton made an affidavit for *plaintiff* stating the facts very differently and in that second affidavit he said that since signing the first one he had talked with Weiss. Then the *National* suit came on for trial and Carlton appeared as a witness for plaintiff. Immediately thereafter he became an employee of the plaintiff (Vol. I, p. 628-632, Q. 109-130).

Next Weiss said that he made some effort to gather data about DPG at the library in Youngstown in May, 1918, and at the Public Library in New York in June, 1918. He said this work at the New York library was done when he was in New York on a vacation, that this vacation covered the first two weeks of June, 1918, and that he returned to Youngstown on June 16th, having missed the train that was to get him there on the 15th (Vol. I, p. 136-7, Q. 206-214, and National Rec. p. 263, Q. 323-5). But the record book of the laboratory of the Republic Rubber Co., where Weiss worked, always referred to as "the X-book" (Ex. 10) contains records of numerous tests recorded by Weiss during this very period when Weiss said he was in New York, such, for instance, as those on pages X-2031 and X-2005 (Vol. I, p. 137, Q. 214; and Vol. II, p. 747 and 731).

The next event, according to Weiss, is that in September, 1918, he started to prepare some DPG and produced five grams in two experiments, and in December he used the five grams "in a rubber compound to try out its activity to find out what it would do with the rubber" (Vol. I, p. 103-4, Q. 54-7). With this DPG, three test-slabs were made, all of

them were overcured and in making them the entire five grams of DPG were used up (Vol. I, p. 104-7, Q. 60-86).

All of this is in such direct conflict with the story as told by Weiss on another occasion that no word of it is entitled to belief. Weiss attempted to tell the story in an affidavit which he signed for use in the *National* suit and there he told it altogether differently. There he said the amount of DPG he prepared in September, 1918, was not sufficient for a test in a rubber compound. His exact words are:

> "As a result of this examination at the New York Public Library, I found very little literature on diphenylguanidine but found sufficient data to enable me to prepare a small quantity of diphenylguanidine which I did during the month of September, 1918. The quantity prepared at that time was not sufficient to permit a test in a rubber compound" (Vol. I, p. 142 and Ex. A, Vol. II, p. 812).

Weiss had to admit that this is inconsistent with his testimony in this case (Vol. I, p. 142-3, Q. 244-6).

Thus there is an unexplained and unexplainable variance on the all-important point of when Weiss first made DPG, what he did with it and when he first used DPG in a rubber compound. Two wholly irreconcilable versions of such important items are at best a sharp warning against acceptance of his testimony in the absence of entirely adequate corroboration.

So turn for a moment to his corroboration. A witness named Halliday (Vol. I, p. 231-242) attempted to tell from recollection about a test he made seven years earlier, which test was one of about 40,000 tests he made in the course of some ten years of employment with the Republic Company, although there was nothing whatever to mark the test in his mind, not even knowledge of what was in the compound tested. He undertook to pick out this one test from along in the middle of ten years of work which consisted of doing the same thing 40,000 times, and to say that, in this instance, the compound had a white powder in it, though he did not know what the white powder was (Vol. I, p. 236, Q. 16), and many of the other compounds from which he made test-slabs

had white powder in them, including all of the compounds in which TPG was the accelerator. He even undertook to state what Weiss said and what he said, and where Weiss stood with reference to his testing machine on the occasion of this one test in 40,000 in the course of ten years (Vol. I, p. 238). There is nothing which at the time would have marked this test as unusual in any way; it was a usual test formula, the inclusion of an accelerator was the usual thing, an accelerator in the form of a white powder was in no respect unusual, and there is no suggestion that the test differed in any way from all of the others that Halliday made at about this time for Weiss and for all of the other four or five men for whom Halliday produced test-slabs day after day and year after year in the ordinary routine operation of a testing machine.

Weiss tried to develop Halliday's story by saying he told Halliday the white powder was "diphenyl", but that means nothing for even if we credit Weiss with an extraordinary memory that enabled him to tell what he said to one of the various workmen who helped him many years ago, still the word "diphenyl" may only have indicated diphenylthiourea which is the chemical name for "thio", the accelerator used so largely in the Republic plant. The whole of the deposition of Halliday, depending as it does merely on recollection under circumstances which presented no occasion for any details of the test to stick in his recollection, is utterly valueless as corroboration of Weiss.

Corroboration was also attempted by the witnesses Nellen and Daniels. Nellen's deposition is as meaningless as Halliday's. Nellen said Weiss told him something about DPG but he would not attempt to fix the date any closer than to say it was between February 1st and November 1st, 1919 (Vol. I, p. 230, Q. 22-3). Of course during September and October of 1919, Weiss did know something about DPG because early in September Daniels told him what he had learned from Dr. Kratz, and we are in accord with plaintiff that there was marked activity in the Republic Company's laboratory in experimenting with DPG throughout the last half of September and the whole of October. So what Nellen said amounts to nothing at all.

The only other corroborating witness is Daniels. He departed from the truth to such extent that everything he said must be open to suspicion. He is the individual whose affidavit was filed in the Patent Office in soliciting the grant of the Weiss patent and in which affidavit the facts were misrepresented, as we have heretofore pointed out (*ante*, p. 31-2). In that affidavit he said that "during the early part of the year 1919" DPG used by the Republic Company "proved to be highly efficient as an accelerator in the actual vulcanization of rubber goods, such as hose, tires, belts, valves and other mechanical goods", whereas the fact is that the Republic Company never used any DPG in the manufacture of those rubber goods or any other rubber goods up to the time when Weiss and Daniels were dismissed from its employ in March, 1920 (Vol. I, p. 146-7, Q. 257-9). It was probably in reliance on the statements in this affidavit that the Weiss patent was granted, for the Patent Office, quite naturally, gives primary weight to the affidavit of someone other than the applicant. So this misrepresentation of facts by Daniels may be responsible for all this litigation.

Daniels again misrepresented the facts in an affidavit which he signed for use in the *National* suit. In that affidavit, he said (Ex. UU, Vol. II, p. 999 and p. 724):

> "I attach hereto photographic copies of one page of the laboratory X-book kept by me, said page being numbered 1777, which contains an entry made by me early in the year 1919, in which entry I recorded a compound to be used as a splicing cement for red inner tubes for automobile tires."

This entry is undated and Daniels' statement that it was made "early in the year 1919" was false. He must have known then that it was made at a later time, just as he knew it was made later when he testified in this suit; and its position in his X-book immediately following other records dated in the fall of 1919 plainly indicated that it was not made in "the early part of 1919". Testifying in this suit, Daniels said he wrote his entry in his X-book "late in the year 1919 or early in the year 1920" (Vol. I, p. 207, Q. 37). He got

around to saying this reluctantly, first saying that he was not absolutely certain whether this entry was made "in the summer or in the fall of 1919" (Vol. I, p. 207, Q. 28).

This perversion of the truth by Daniels is one of several efforts made by the witnesses for plaintiff to make experimental work which was done in the fall of 1919 appear to be work done in the summer of 1919, the difference being all-important because it makes all the difference between what have been called a *post*-Kratz and a *pre*-Kratz experiment.

Plaintiff's counsel have characterized this false statement in the Daniels' affidavit as "an inconsequential error". But on the contrary it was an error in a vital matter. The whole purpose of the affidavit was to prove that Weiss had completed his invention prior to the Kratz paper, and in achieving that purpose this experiment by Weiss was put forward as one of the things Weiss did with DPG prior to the Kratz paper. So when Daniels said it was done "early in the year 1919", he made the experiment of vital importance when in fact it was wholly irrelevant by reason of having occurred after the Kratz paper.

Furthermore, Daniels is directly contradicted on two important points by defendant's witness Clark, who was his immediate superior in the Republic Company. Daniels said he told Clark of Weiss' work on DPG in the spring or summer of 1919 (Vol. I, p. 222, Q. 135) and Clark said that was not so (Vol. I, p. 444, Q. 34-8). Also Clark and Daniels are directly opposed as to whether there was discussion of dismissing Weiss from the employ of the Republic Company early in 1919 (Vol. I, p. 221, Q. 125-131 and p. 443-4, Q. 28-35).

Going back to Weiss and his story, it appears that some few weeks after he made his first DPG he made a second lot which was about 25 grams. This is stated to be the fact both in the affidavit (Ex. *A*, Vol. II, p. 812) and in his testimony in this suit (Vol. I, p. 103-7, Q. 54-82). But another discrepancy arises as to the date when this second batch of DPG was made. In his testimony in this case he said the 25 grams of DPG were made *before* a trip in January 1919, to Pittsburgh

to consult the literature in the Carnegie Library (Vol. I, p. 140-1, Q. 230-9). In the affidavit, however, the opposite is stated to be the fact. In the affidavit he said he did not have sufficient data about DPG and that he went to the Carnegie Library in Pittsburgh to get additional data, and that there he "found descriptions of various processes for making DPG by laboratory methods" and that it was after his return to Youngstown with this data he had collected at Pittsburgh that he made the second batch of DPG which amounted to 25 grams (Ex. A, Vol. II, p. 812 and Vol. II, p. 141-3, Q. 240-6).

No record of any of this work is produced. The laboratory where Weiss worked had the special record book, known as the X-book, in which all work done was supposed to be recorded. Defendant's witnesses, Brill and Clark, and plaintiff's witness Daniels, all stated unqualifiedly that it was a rule of the laboratory that all experiments and tests conducted there were to be recorded with care as a permanent record for future reference (Vol. I, p. 305, Q. 35-8; p. 219, Q. 113-7; Vol. II, p. 1008-9). Weiss said there was some special dispensation in his favor, leaving it to his judgment as to what parts of his work he would record, but this was repudiated by his principal corroborating witness, Daniels (Vol. I, p. 152-3, Q. 291-7; p. 219-220, Q. 114-120).

So all of this work, if it was done, should have been recorded and the records of it should now be available and should be in evidence in this case. But no record was produced. Instead, Weiss said he recorded how he made his DPG in a personal note-book kept by him, not in any laboratory records where it should have been recorded, and of course this note-book was consumed in a fire which occurred at the plaintiff's first plant (Vol. I, p. 113, Q. 108; p. 201, Q. 548-551). Weiss' "personal records", including one which he produced when he thought it would serve his purpose, (Ex. 5) he said were at his home, but this personal note-book, though it was a "personal record", was in the plant and according to Weiss was burned.

In reality, nothing with any continuity or momentum to it was done with DPG in the Republic plant prior to September 6, 1919. After that date there was feverish activity. The significance of this is so overwhelming that Weiss and his associates have yielded to the temptation to try to change some of the *post*-Kratz work into *pre*-Kratz work and the result is falsification. The statement in the Daniels affidavit above referred to is one instance and there are others on which we shall comment.

On the portion of Weiss' story to which we have referred, the corroboration by Daniels is of the most general character. He said Weiss told him "he had an idea about the production of DPG" and that Weiss made some test-slabs "that looked pretty good" and that he saw and felt these test-slabs (Vol. I, p. 204, Q. 15-16). In what respect they looked "pretty good", and how long they were cured, and how much accelerator was used in them, and whether they indicated in any way any advantage in the use of DPG over using TPG were not mentioned by Daniels.

Plaintiff's counsel have asserted that Weiss's statements are corroborated by affidavits of Seil and Greenwald filed in the Patent Office in connection with the Weiss application. By what rule of law these *ex parte* affidavits become evidence in this case is not suggested. Probably if Seil and Greenwald had been produced for cross-examination it would have developed that the allegations in their affidavits were untrue, just as actually did happen in the case of Daniels. The very fact that these men, Seil and Greenwald, were not produced as witnesses for the plaintiff on the vital point of what Weiss did with DPG prior to the Kratz paper, justifies the inference that, if produced, their testimony would have been unfavorable to plaintiff.

Summarizing the foregoing, we submit that on the basis of such unreliable evidence as that of Weiss, Halliday, Nellen and Daniels, one would not be warranted in accepting any of the assertions about Weiss's work with DPG prior to September, 1919, in the absence of corroboration in a contemporane-

ous document. This narrows the field of consideration to a small number of tests recorded in the X-book of the Republic Rubber Co., (Ex. 10) and consideration of them throws further light on Weiss' credibility. We shall refer to them in the order in which Weiss mentioned them in his testimony beginning on page 114 of the record. As to all these tests and the X-book in which they are recorded, Weiss is the only individual who gave any specific testimony about them. Daniels, his immediate superior who claimed that he kept in daily touch with Weiss's work, said he had no recollection of looking at any specific records Weiss made at the time of these tests (Vol. I, p. 204-5, Q. 16-18), and he did not identify either the X-book or any of Weiss's tests in it. Thus this X-book, the only contemporaneous document dealing with these tests, depends for its authentication on the testimony of Weiss alone.

First there is the entry in the X-book on page X-2034, column E (Ex. 10, Vol. II, p. 748 and 749). Its date has been changed and Weiss said he changed it (Vol. I, p. 153, Q. 299). It is fitting that this history of Weiss, with its fire that burned up his note-book where everything of value was recorded, affidavits misrepresenting the facts and affidavits at variance with the testimony, should have also a record whose date has been changed. If this date is important, the test recorded in connection with it should be dismissed from consideration. And it is important for it involves all the difference between a test made *before* and one made *after* Weiss was given Dr. Kratz' data about DPG. Certainly this test is entitled to no consideration as a *pre*-Kratz test; but at present we are discussing only Weiss's credibility.

Weiss said the date as originally written probably was "1-10-19"; he said

> "I might have put down '1/10/19' and corrected myself, making a '2' out of the '1'" (Vol. I, p. 191, Q. 491).

But examination of the original X-book we think should make one feel very sure that what Weiss said is untrue. The

Judge of the District Court looked at the date as it appears in the X-book with the aid of a strong magnifying glass and was thoroughly satisfied that the figure put there originally was a "9". He said:

> "A casual examination discloses that the month has been changed; and an examination under a strong glass plainly shows that the 2 was originally 9, thus making the original date September 10, 1919, 3 days after Kratz's table of accelerators had been given to Weiss" (Vol. I, p. 693).

Furthermore, a handwriting expert, Mr. Haring, was produced by defendant (Vol. I, p. 447-472) and he stated unqualifiedly that the original figure was a "9", (Vol. I, p. 447, Q. 5-6) indicating September 10, 1919, a date subsequent to the acquisition by Weiss of knowledge of Kratz's work. Mr. Haring said that the original figure could not have been a "1" and he gave what we think are convincing reasons for his conclusion that the figure initially written was a "9". Furthermore, he stated that he reached this conclusion before any suggestion was made to him as to what figure any individual thought was there originally or what conclusion by him would favor the contention of one side or the other in this suit (Vol. I, p. 451, Q. 20).

Furthermore, this test recorded on page X-2034 is a test on a pure gum stock as distinguished from a shoddy or reclaimed rubber stock and Weiss said this test with the pure gum stock was the first one he made (Vol. I, p. 114). To the contrary, however, is a statement by Weiss in the *National* case where he said that his "first thought" after he had made some DPG was to see how it would work with shoddy (Vol. I, p. 173, Q. 411, and Nat. Rec. p. 229). If this statement was true and Weiss did proceed first to see how the DPG would work in a shoddy compound, it would follow necessarily that the test recorded on page X-2034 was not made on February 10, 1919, but was made at a later time after Weiss's tests with shoddy compounds and in fact after the reading of the Kratz paper.

Next Weiss said he recorded a test in column G on page X-2006 (Vol II, p. 731) but on that entry there is no date, so there is nothing but Weiss's assertion, for such value as it may have, that the test was made early in 1919.

Next he referred to two tests on shoddy compounds, that is compounds in which the rubber ingredient is re-claimed rubber. These two tests are recorded in column H on page X-2006, (Vol. II, p. 731), dated February 21, 1919, and in column A on page X-2042 (Vol. II, p. 753), dated March 4, 1919. We shall comment at length upon them later (*post*, p. 58-9).

Next Weiss referred to tests recorded on page X-2010 (left) column H and X-2010 (right) column H (Vol. II, p. 736). The latter is the only one in which DPG was used and it is dated "9—29—19", so it is distinctly a *post*-Kratz test occurring during the period of great activity in testing DPG immediately following Daniels' return from hearing Dr. Kratz' paper at Philadelphia. Because of this date, Weiss tried to tie this test up with the one in Column H on the left dated September 6, 1919, where a different accelerator was used; this latter test is dated September 6, 1919, and it seems to have been Weiss's hope that these two tests would be considered as one, made all at the same time, for the purpose of comparing two different accelerators. This is one more of the numerous efforts to draw work done subsequent to September 6, 1919, back to a time prior to that date. This instance is a feeble effort because there is no reason why one should assume that the test recorded in column H on page X-2010 at the right was not made on the date noted. namely, September 29, 1919; the formula used may have been a standard formula, or, in making the test on September 29, Weiss may have wanted a comparison with the result he got in another test with a different accelerator recorded on September 6th. Or, what is more probable, Weiss may have wanted to compare DPG and TPG so he used those two accelerators in closely similar shoddy compounds, both on

September 29th, and recorded both tests in columns G and H on page X-2010 at the right.

Weiss said he got the recipe for these tests from Nellen to whom he talked about DPG "late in the summer of 1919" and "some time in August, 1919" (Vol. I, p. 118, Q. 118-9). Here is another effort of Weiss to pull something back into the period prior to Sept. 2-6, 1919. But he had no way whatever of fixing the date when he talked with Nellen beyond saying that it was a "few months" after some other event and that he, Weiss, had his coat off at the time (Vol. I, p. 118, Q. 120). Of course, if the "few months" had been one more month than Weiss thought of as a few months, the talk with Nellen would be in September, after the Kratz disclosure, and we frequently have warm enough weather in September for a man working around a factory to leave off his coat, even assuming that six years after the event Weiss could recall the month of an unimportant talk with a co-worker and the condition of the wholly unrelated matter of his apparel at the time of the talk.

Nellen testified as a witness for plaintiff but he would only say that he gave a standard shoddy formula to Weiss at some time between February 1st and November 1st, 1919, which, of course, means nothing (Vol. I, p. 230, Q. 18-26).

Next Weiss said he made "some hundred grams of DPG some time in August of 1919" (Vol. I, p. 122, Q. 132), though he gave nothing whatever as a reason for stating that this DPG was made in August and not in September, after Daniels told him on the strength of Kratz's paper that DPG was an active accelerator, nor is there any record of the manufacture of this DPG, or of any use to which it was put prior to September 10th. There is just the wholly unsupported statement of Weiss, an interested witness shown to have stated most important items of his story in irreconcilably conflicting ways and endeavoring to state from memory of occurrences six years old whether or not he did a thing in one month or in the month immediately preceding.

Counsel for plaintiff have referred time and again to

this supply of DPG, said to amount to several hundred grams, which Weiss is supposed to have made at some time in the summer of 1919 prior to the Kratz paper. They say it is improbable that DPG in an amount anything like 200 grams would have been made unless it had been intended to put it to some real use. The fault in their discussion is that there is no acceptable proof that any such supply of DPG was made by Weiss at any time prior to the Kratz paper. It is altogether probable that Weiss did make a supply of DPG immediately after the reading of the paper for he was instructed to do so by Daniels. But as to making it before the Kratz paper, there is just Weiss's statement that he made this supply "some time in August of 1919". Testifying five years after the event, it is impossible that one could say truthfully that the event occurred in August and not in September without some reliable document to assist his recollection. The only semblance of corroboration is Daniels' testimony; he said this DPG was made "in the summer of 1919" (Vol. I, p. 206, Q. 25), and in the next few answers, notably the answers to questions 28 and 37, he showed how impossible it was for him to state the date of any of these events with any accuracy.

Next Weiss told of the inner-tube splicing cement made with DPG and said that was made "in the summer of 1919" (Vol. I, p. 123, Q. 135). This is the cement made at Daniels' instigation, to which we have heretofore referred (*ante* pp. 43-4) and here Weiss and Daniels are in direct conflict. Weiss said the cement was made "in the summer of 1919", whereas Daniels said this splicing cement was made "late in the year 1919 or early in the year 1920", (Vol. I, p. 207, Q. 37) and obviously it was made as Daniels said, late in 1919 or early in 1920, for the undated record of it on page X-1777 (Ex. 9, Vol. II, p. 724) is preceded by pages dated in the late fall of 1919 and followed by pages dated in 1920.

Next Weiss referred to a test entered on page X-2064, column D (Vol. II, p. 764) and made in October, 1919, one

of the considerable number of tests of DPG made by Weiss after he had been informed by Kratz of the value of DPG.

Next he referred to the undated tests with DPG in the six columns on page X-2066 (Vol. II, p. 765). These tests he said were made in the summer of 1919 (Vol. I, p. 125, Q. 139). Nothing but the unaided recollection of this interested witness is given by way of fixing these tests in the summer rather than in September or October, 1919, and this page, X-2066, follows three pages of tests in September, October, November and December, 1919, and is followed by pages of tests in 1920. Also, the entry of these tests is in ink of the same distinctive color used on the pages immediately preceding. Mr. Haring, the handwriting expert, said that this ink was not used in making any of the entries in the X-book dated prior to the Kratz paper (Vol. I, p. 451-2, Q. 21-5). Furthermore, when Weiss was on the witness stand in the *National* suit and told about his two tests with shoddy compounds and the one test with the changed date, he was asked if the X-book contained any other record of a test with DPG made prior to September 2-6, 1919, and was instructed to go through the X-book in search of any such test, and at no time did he ever suggest that these entries on page X-2066 or any others in the X-book, except for the three above identified, were made prior to September 2-6, 1919 (Vol. I, p. 170-1, Q. 398-403, and Nat. Rec. p. 280-1, Q. 428-30).

The only other tests to which Weiss referred are those in the X-book dated in October and November of 1919, and not only do we admit that such tests were made and recorded in the X-book, but we call attention to them and to the considerable number of them, in fact the enormous number relatively to the number of recorded tests prior to the Kratz paper.

This consideration of Weiss' testimony about the tests he made with DPG and the record of them in the X-book, reflects further upon his credibility. The persistent effort to place events prior to September, 1919, with no reason for doing so and the contrary plainly indicated, the change of

the date in the record of one of the tests, the conflict between Weiss and Daniels as to the time of the splicing cement test, the placing of one series of tests in the *pre*-Kratz class when that was not done in the *National* suit though Weiss was asked what tests he put in that class, etc., added to the irreconcilable conflict between Weiss' testimony in this case and the affidavit he gave in the *National* case, and the absence of records of the tests he said he made in a place where he was duty-bound to record them, condemn him so strongly that, in our opinion, he is completely discredited. Also, the same conclusion should be reached with respect to Daniels; the grounds for this conclusion with respect to him are less numerous but are equally serious.

This conclusion, so far as Weiss is concerned, was reached by the Examiner of Interferences in the United States Patent Office in a decision in an interference proceeding. Weiss's record in that interference and the brief in his behalf are in evidence in this suit as Exhibits D and VV. The question at issue in that proceeding is which one of three applicants for patents, Weiss and two others, was the first to originate the use as an accelerator of another di-substituted guanidine called ditolylguanidine, to which reference was made from time to time in the record of this suit. Weiss claims to have conceived the idea of using ditolylguanidine (DTG) in 1919 and to have disclosed it to Daniels and later to his associates in the Dovan Company, Doty and Woodward. It was shown in the record of the intereference that Woodward tried by improper methods to influence the testimony of a witness called in behalf of one of the other parties. This is the matter referred to on pages 646-7 of the record in this suit and pages 274-6 of Exhibit VV. Also, it was shown that Weiss had tried improperly to influence the testimony of another witness. The decision of the Patent Office, a certified copy of which was filed in the District Court, includes the following:

> "A cloud of doubt is cast over all the evidence advanced by Weiss by the occurrence of two incidents

during the taking of testimony by the party Scott, either of which alone would seriously affect the credibility of the Weiss testimony. It appears that at the instigation of Woodward (who is interested in this proceeding and whose corroboration is relied upon by Weiss) an effort was made to influence the testimony of Dr. Weber, rubber expert, called in rebuttal by the party Scott. (Scott record, pages 287 and 289). The second incident likewise occurred during the taking of rebuttal testimony by Scott, and is even more serious than the first. There is more than a strong suspicion that the party Weiss himself endeavored to intimidate the witness Abrams into silence on the witness stand by threats of uncomfortable cross-examination if he should say too much. (Scott's record, p. 267 and 270).

"Little weight can be given any of the Weiss evidence where such grossly unethical conduct was indulged in."

For these numerous reasons we think the whole claim of this plaintiff that any work with DPG was done by Weiss prior to the Kratz paper of September, 1919, should be rejected on the ground that the testimony offered in support of it is altogether too unreliable. The comment of this Court in *Deering* vs. *Harvester Works* (155 U. S. 286, 300) is particularly applicable here:

"As we have had occasion before to observe, oral testimony, unsupported by patents or exhibits, tending to show prior use of a device regularly patented is, in the nature of the case, open to grave suspicion. *The Barbed Wire Patent*, 143 U. S. 275. Granting the witnesses to be of the highest character, and ever so conscientious in their desire to tell only the truth, the possibility of their being mistaken * * * are such as to render oral testimony peculiarly untrustworthy; particularly so if the testimony be taken after the lapse of years from the time the alleged anticipating device was used. If there be added to this a personal bias, or an incentive to color the testimony in the interest of the party calling the witness, to say nothing of downright perjury, its value is, of course, still more seriously impaired. This case is an apt illustration of the wisdom of the rule requiring such anticipations to be proven by

> evidence so cogent as to leave no reasonable doubt in the mind of the Court, that the transaction occurred substantially as stated."

Also, in connection with the frequent assertions of Weiss and Daniels that this or that was done "in the summer of 1919", expecting one to understand from this general statement that the test in question was made prior to the Kratz paper of September 2-6, 1919, rather than after it, a particularly pertinent precedent is found in *Clark Thread Co.* vs. *Willimantic Co.*, 140 U. S. 481-493. There an anticipating patent was presented by defendant having an effective date of July 22, 1858, and the patentee endeavored to offset its effect by testifying about what he did in July 1858, that is, making no statement as to whether it was done before or after July 22. Just so in this case, Weiss and Daniels spoke repeatedly of this or that as done in the summer of 1919, without specifying whether it was done before or after September 2-6, 1919; and anything Weiss did with DPG after September 6, 1919, is of no avail to plaintiff for by that time Weiss had been advised by Kratz of the value of DPG. In the *Clark Thread* case (p. 488), this Court said:

> "The generality of the expression,—'July 1858'—excites attention, and in this case it is not applying too strict a rule to say that the evidence should be construed most strongly against the complainants; and this would necessarily lead to the inference that the invention was completed in the last part of July, subsequent to the publication of the English patent. We feel bound to put this strict construction upon the patentee's evidence because such testimony, given for the purpose that this was, is necessarily subject to the gravest suspicion, however honest and well intentioned the witness may be."

3. Weiss's Work Prior to the Kratz Paper.

Suppose now we assume that all the records produced by plaintiff are accurate and that the various tests were made; even so, all the work Weiss did with DPG up to September, 1919, was inconclusive. It was wholly lacking in continuity,

in momentum, in progress toward any useful result. The truth of this statement (1) was stated plainly and directly by *plaintiff's* witness Daniels; (2) is clearly indicated by the course of the work on accelerators at the plant of the Republic Rubber Company; and (3) is shown by the records of the tests.

First, plaintiff's witness Daniels said Weiss had gotten nowhere with his work on DPG up to the Kratz paper. He said it inadvertently when he was discussing another subject, but, as is often the case, it is in that way that the truth comes out from an unwilling witness.

If Weiss had had any ideas of value on the subject of accelerators in the early part of 1919 and had disclosed them to Daniels, the natural thing for Daniels to do was to tell his superior, Seth Clark, about them. What accelerator to use and how to use it and how to make it were pressing problems in the Republic organization at that time, and, of course, Daniels would have told Clark of any solution of such a problem that came to him or any indication that he and his assistants were on the track of a solution.

Daniels asserted that he did tell Clark prior to the Kratz paper of Weiss's work on DPG (Vol. I, p. 222, Q. 133-5, though Clark denied it, p. 444, Q. 34-8). In that connection, that is, in stating that he told Clark of Weiss' work, Daniels said "I told him (Clark) we were doing something with it (DPG) **but I wasn't prepared to say how good it was"** (Vol. I, p. 222, Q. 135). That brief statement is a very clear index of how far Weiss had gotten by the summer of 1919 with any work he was doing with DPG. Evidently he did not know whether or not DPG was going to prove of any value, whether or not it was going to be in any way superior to TPG.

Second, as to the course of the work of the Republic Company, it was stated by Daniels that in 1918 and the first half of 1919, the accelerators which the Republic Company was using were unsatisfactory and that the need for something better was appreciated and that all through that time work on the development of TPG was in progress and that

TPG was the accelerator that looked most promising. A plant was built for the production of TPG and evidently the expenditures of the Company on the development of TPG at this time when it could so ill-afford such expenditures, were quite considerable (Vol. I, p. 210-2, Q. 53-62). It is inconceivable that the work would have taken this course if the chief chemist, Daniels, and one of his assistants, Weiss, had known that DPG would have been a much better accelerator for them to use. Had that been the case, the company's activities and the resultant record in the X-book would have been much different.

So the work on the development of TPG ran along through the first eight months of 1919 until Daniels went back from the Philadelphia meeting after hearing the Kratz paper. Then the whole condition of affairs changed abruptly (Vol. II, p. 1005, Q. 17-21). Daniels showed Weiss Dr. Kratz's figures which he had copied at the meeting and told him that it looked "as though DPG had a great deal on TPG," and that he "wanted some work done on DPG" (Vol. I, p. 218, Q. 106-10). The X-book shows the immediate effect of this direction by Daniels to Weiss to do some work on DPG. Beginning immediately after that conversation in the first half of September, 1919, and running on through the balance of September, through October, through November and through December, there was a succession of tests with DPG following one another at brief intervals throughout that entire period.

To complete the picture of the effect of Dr. Kratz's paper within the Republic plant, reference should be made to the letter forming Exhibit F (Vol. II, p. 845). Another chemist in the employ of the Republic Company by the name of Stevens was sent to New York in the fall of 1919 after the Kratz paper to make a further and more thorough investigation of the chemical literature with reference to DPG (Vol. I, p. 224-5, Q. 143-153). Evidently he wrote back to Daniels some information about TPG and Daniels thought any time that Stevens devoted to TPG was wasted, so Daniels put a

postscript on a letter he wrote to Stevens on December 1, 1919, in which he said:

> "On re-reading your letter I'm not sure but that you are spending a little too much time on *tri*phenyl. Remember we are thru with that. *Di*phenyl is the king pin now."

Thus for a period of from six to ten months after the date of invention claimed for Weiss, the Company went along with work on TPG and devising and erecting a special plant for the manufacture of TPG. Then, with the reading of the Kratz paper, all of this expensive work, undertaken after Weiss's alleged invention, was relegated to the discard and the Chief Chemist said "we are through" with TPG. In those circumstances it must be that it was the Kratz paper of September, 1919, and nothing else that caused Daniels to write on December 1, 1919, that DPG "is the king pin now."

Third, the same conclusion that Weiss's work with DPG prior to September, 1919, was productive of nothing of value is arrived at on consideration of the X-book records. There are but two recorded tests to be considered for those two are the only ones that bear dates prior to September, 1919; the test with the changed date cannot, on this record, be considered as a *pre*-Kratz test.

The two tests referred to are tests of shoddy compounds, the same or closely similar to other tests either using a different accelerator or no accelerator at all, and from the figures noted as to the tensile strength and elasticity of the products obtained, it is evident that at the time these tests were made no one who studied the results or examined the record of them would have concluded that the accelerator used offered any advantage over other accelerators then available. This is set forth at length by defendant's witness, Bridgewater, on pages 493 to 502 of Vol. I. of the record and the exhibits referred to by him; his testimony shows definitely that these two recorded tests by Weiss on shoddy compounds could not have indicated to Weiss any value in DPG as an acccelerator. That is doubtless the

reason why there is no record in the X-book of any test by Weiss or any one else with DPG at any time between March 4, 1919, and the reading of the Kratz paper in September, 1919. Instead, the Republic Rubber Company was working throughout this period on the development of TPG and a commercial plant for the manufacture of TPG for use as an accelerator in the Republic factory.

Weiss came very close to admitting the truth of what Bridgewater said. In the *National* case, while testifying about these shoddy tests, Weiss said (p. 229):

> "My first thought then, after I prepared diphenylguanidine in a quantity that I could test out, was to see how it would work on a shoddy compound, and I prepared a shoddy compound and tested that out, and found from the results, though, that *it was not to any degree much better than triphenylguanidine.*" (Emphasis ours.)

He tried to modify this statement as much as he could in this record (Vol. I, p. 173-4, Q. 411-6), but it was and is impossible for him to get away from the fact that he once gave as his opinion that these shoddy tests indicated that DPG "was not to any degree much better than TPG".

All this evidence was considered by the District Court and its conclusion recorded in the opinion was that these tests which Weiss claimed to have made and which are recorded in the X-book "show no marked superiority of DPG over TPG" (Vol. I, p. 691).

For these three reasons we assert with the utmost confidence that all of any work Weiss may have done with DPG prior to the Kratz paper was wholly inconclusive. It gave him no knowledge of the value of DPG as an accelerator. Had nothing been done at that time by Kratz, Weiss and the rest of the staff of the Republic Company would have gone on with the use of thio and the development and use of TPG without giving further thought to DPG. Instead, however,

Weiss came into immediate possession, through Daniels, of Dr. Kratz's definite statement that DPG was many times more active than TPG, (Vol. I, p. 217-8, Q. 102-4) and because of that there was immediate activity in testing DPG time and again throughout the next few months and recording the tests in the X-book. This, we say, is the conclusion which should be reached if all the testimony of Weiss and the other witnesses for plaintiff were accepted without questioning its reliability.

The conclusion that all the work Weiss claims to have done prior to the Kratz paper was wholly inconclusive and led him to no results of any value, is the conclusion reached by the Court of Appeals for the Second Circuit in the *National* case and expressed as follows:

> "We do not believe that anyone regarded DPG as a seriously preferable accelerator, until after the Kratz paper, because that chemist was plainly on this record the first to give comparative figures demonstrating the great saving of time following the use of DPG. He gave definite and persuasive reasons for the preference. We therefore incline to regard all the *pre*-Kratz work as merely experimental, and guided by no principle" (292 Fed. 559).

The District Court in this case arrived at that same conclusion, stated in the opinion as follows:

> "That a complete discovery of the qualities of DPG had then been made, seems impossible under the surrounding circumstances. The test book actually showed only two inconclusive tests by Weiss" (Vol. I, p. 694).

Therefore, and for these several reasons, we maintain that with respect to the Kratz paper alone, plaintiff has failed to sustain the burden which the law puts upon it of showing by evidence which eliminates all reasonable doubt that the alleged inventive act set forth in the patent in suit was completed before the presentation of the paper, and the claim of infringement should be dismissed for that reason alone.

SECOND DEFENSE.

The Weiss patent is invalid because of prior invention by Dr. Kratz and prior knowledge by him and his associates.

If it be held that the Kratz paper published in April, 1920, and the knowledge imparted to the rubber world by Kratz when he read his paper in September, 1919, have been antedated by Weiss, then the work on DPG which Kratz did before he prepared his paper and to develop the information included in the paper, must be considered. The proofs show that everything Weiss claims to have done before September, 1919, had been done by Kratz at an earlier date and that Kratz' work with DPG went far beyond anything which Weiss even claims to have done.

To facilitate a comparison between the utmost that Weiss claims to have done and what the proofs show was done by Kratz, we append at the end hereof a "Chronology of the Work of Kratz and Weiss" in parallel columns.

The information about accelerators contained in the Kratz paper is so comprehensive, goes into such detail, and is so accurate in that it gives definite figures for the ingredients of test compounds and for the relative activities of various accelerators, that the development of the data on which the paper was based must necessarily have been extensive, and must necessarily have covered a considerable period of time. As a matter of fact, Kratz had been a student of accelerators for over seven years (Vol. I, p. 337-341, Q. 7-18). Prior to 1914 he had been in the employ of the Diamond and Goodrich Companies as a research chemist; then on April 1, 1914, he went with the Norwalk Tire & Rubber Co. in the capacity of chemist; and then in April, 1917, he became chief chemist of The Falls Rubber Co. His first work in connection with the use of the guanidines as accelerators was in 1913 (Vol. I, p. 341, Q. 16).

In 1916, while with the Norwalk Co., Kratz prepared DPG and demonstrated its utility as a rubber accelerator by making test-slabs of exactly the same sort that Weiss made

at a later time and of exactly the same sort that rubber chemists are continually making at the present day and have made day after day for years past. Not only did Kratz make and test DPG as an accelerator, just as Weiss did later, but he did it time after time, and did it in such a way as to give him exact information as to what its accelerating value is (Vol. I, p. 344-357). This is something Weiss never did and does not claim to have done at any time prior to the Kratz paper. Kratz's work in 1916 enabled him to arrive at a figure representing the exact degree of superiority of DPG over TPG, aniline and various other accelerators. By the application of this figure he could determine exactly how much DPG it would be necessary to use to produce the same accelerating effect as would be produced by a larger amount of TPG or still larger amounts of aniline and thio.

The work Kratz did at Norwalk, which produced these valuable figures, was known to and participated in by his associates in the Norwalk Co., notably his immediate superior, Dr. Russell (Vol. I, p. 355-6, Q. 75-9 and Vol. II, p. 1019-1023) and was recorded in a carefully prepared, contemporaneous report which he left in the files of the Norwalk Co. (Ex. R, Vol. II, p. 952-6). He attached such value to the results of this work that when he left the employ of the Norwalk Co. he took with him a record of the information for his own use in his future work (Ex. Q, Vol. II, p. 945-951).

All this is covered by the testimony of Dr. Kratz, the corroborating testimony of Dr. Russell, the record of the work prepared by Dr. Kratz for the Norwalk Co., and the personal record which Kratz took with him to the Falls Co.

Then along in the fall of 1917 when Kratz was chief chemist of the Falls Co. he received a special order for one thousand inner tubes for automobile tires, and at that time he had a small supply of DPG which he himself had made. In filling this order, the one thousand tubes were made under Kratz' personal supervision, and, in doing so, the supply of DPG which Kratz then had was used, as far as it would go, that is, in the manufacture of about 300 of the tubes. That

exhausted the supply, and in filling the remainder of the order, another accelerator was employed (Vol. I, p. 358-372).

A little later, Kratz conducted at the Falls plant a series of tests with DPG closely paralleling the series of tests which he had made in 1916 at the Norwalk plant. At Norwalk most of the compounds tested by him with DPG included zinc oxide and he wanted to verify the results obtained in tests of the same accelerators in rubber compounds which did not include zinc oxide. So the tests were made over again without oxide in the compounds, and figures representing relative accelerating values of the same substances were again developed to check up the accuracy of the figures arrived at in 1916. The results obtained were so closely similar to those obtained in 1916 as to confirm fully the accuracy of the original figures (Vol. I, p. 373-5).

These tests in 1918 were made preliminary to the preparation of the paper read before the American Chemical Society in 1919. They represent but a part of the work actually done in the preparation of the paper, for the paper itself makes it obvious that its preparation involved much investigation and study of the fundamental principles of the accelerating action. With the detail of that work, however, we are not now concerned. The important fact is that in 1916 and again in 1918 Kratz made DPG and used it in the production of test-slabs of rubber in a series of comparative tests which enabled him to fix the accelerating value of DPG exactly by reference to the best known standards, namely, aniline and thio. In doing this, he did just what Weiss claims to have done in the fall of 1918 and in 1919, but he went far beyond anything Weiss claims to have done, for his work developed an *exact* value for DPG where Weiss claims only that his work showed *some* value for DPG.

Kratz' Work at Norwalk in 1916.

Kratz' work with DPG at Norwalk is covered by two sets of records, both in evidence, both in Kratz' handwriting, and both giving details of the same work. One set was pro-

duced from Kratz' personal file at the Falls Co. (Vol. I, p. 341-2, Q. 19-28; and Ex. Q., Vol. II, p. 945-951). The other set was produced from the files of the Norwalk Co. and is Kratz' formal report to his employer on this work (Vol. I, p. 348-9, Q. 48-50; and Ex. R., Vol. II, p. 952-7). It is the permanent, official record of the Norwalk Co. of work done in its laboratory and by its chemists, and its authenticity, character and purpose have never been questioned.

The purport of this record of Kratz' work is plain from the document itself; in addition, there is in the record a full discussion and detailed explanation of it by Dr. Kratz, and he was corroborated in all respects by Dr. Russell, who was his immediate superior at the Norwalk Co. and who followed his work closely and discussed it with Kratz at the time. Dr. Russell is Chief Chemist of the Norwalk Tire & Rubber Co., and he himself obtained these records of Kratz' work from the files of the Norwalk Co. and presented them at the trial of the *National* suit.

It will suffice to refer to the Norwalk company's record of Kratz' work because that was his final and official record, and also it is somewhat more complete than Kratz' personal record which constituted the notes from which the formal report was prepared.

Kratz made a series of tests with each of eight accelerators and summarized the results on the sheet of Exhibit R dated Nov. 1, 1916 (Vol. II, p. 953), which is so illuminating that it may well be quoted:

"XI/1/16 G. D. K.

Relative Catalytic Effect of Compounds Related to Sulpho Carbanilide.

The following formula was used to try out the activity of various substances more or less closely related to sulpho-carbanilide.

White Para	100
Zinc Oxide	100
Sulphur	5

The following effects were recorded and, in cases where an acceleration was produced, the amounts req'd to give a cure in one hour equal to the cure produced by 3% of S-Carb, were as follows:

Aniline	= 3.5%	
Di phenyl thio urea	= 3.0%	
Mono " " "	= 1.5%	
Thio urea	= 1.0%	(+)
Tri phenyl guanidine	= 1.75%	
Di phenyl guanidine (sym)	= 0.25%	
Mono-ph-guanidine	= 0.25%	
Urea	= 0.33%"	

The figures in this record represent relative accelerating values of various substances and were determined by Kratz in the course of a considerable number of tests with each one of the substances named, a series of test-slabs being made in each instance and the series being extended until the desired result was obtained (Vol. I, p. 345-6).

In this table of relative accelerating values, the first substance is aniline and the second is thio (diphenylthiourea). These two substances were so generally known and had been so widely used as accelerators that they served admirably as standards of comparison. Kratz said they were "well-known substances capable of general application and comparison" (Vol. I, p. 351, Q. 63) and the King publication of 1916 (Vol. II, p. 921) refers to thio as "one of the oldest accelerators known in this country." These well-known substances and each of the others in the table were used as accelerators in rubber batches compounded in accordance with an old and commonly used formula (Vol. I, p. 350, Q. 54) and in each instance a series of test-slabs was made, varying one factor after another through progressive steps until the desired result was obtained. The entire procedure was described by Dr. Kratz in ample detail (Vol. I, p. 345-352, Q. 37-63), and he was corroborated by Dr. Russell (Vol. II, p. 1019-1023).

The table referred to is that appearing on the sheet of Exhibit R dated November 1, 1916 (above quoted), where the results of the tests are summarized. For instance, the table gives 0.25 as the amount of DPG required to produce the same accelerating effect as 1.75 of TPG from which it follows necessarily that Kratz' tests taught him that DPG was seven times as strong or as active as TPG.

The sheet of Exhibit R dated October 31, 1916, (Vol. II, p. 952) gives the steps by which these results were obtained. For instance, it appears from this sheet that a series of tests were made with DPG in which the amount used in the batch of rubber was progressively decreased from 3 parts, to 1 part, to 0.7 parts, and finally to 0.5 parts, and to check the accuracy, one of the tests was made both with and without zinc-oxide in the rubber mixture. The slabs produced when using the 0.5 DPG were found to be the best so .25%, representing the 0.5 parts of DPG to 200 parts of rubber, is the figure that was put into the final table (p. 953) as the relative accelerating value of DPG.

The DPG which Dr. Kratz used in these tests he prepared himself (Vol. I, p. 354, Q. 72-3). The method by which it was prepared is described on the page of Exhibit R dated November 3, 1916 (Vol. II, p. 954). The page dated November 17, 1916 (p. 955), describes another method which was found less satisfactory, so the one described on the page dated November 3 is the one used in producing the material actually used (Vol. I, p. 355, Q. 74).

As stated above, Dr. Kratz was corroborated in his detailed description of this Norwalk work by Dr. Russell (Vol. II, p. 1019-1023). Furthermore, there is no word of any witness in any way contradicting or questioning any word of what Dr. Kratz and Dr. Russell said about this work at the Norwalk Co. It is manifest, therefore, that back in 1916 at the Norwalk Co., Dr. Kratz made test-slabs of rubber with DPG as the accelerator just as Weiss claims to have done two years later. But Kratz made many more slabs and made them in accordance with a definite plan. His plan and

procedure produced exact figures representing definite comparative values, and those definite values were recorded in a table included in a report with which his associates were familiar and which went into the files of information on accelerators kept by a rubber manufacturing company to which reference could be made at any time. Nothing in any way approaching this was ever done by Weiss prior to becoming informed of Dr. Kratz' work immediately after the Kratz paper was read.

The Tubes Made by Dr. Kratz.

This work of Kratz we have just described was done at the Norwalk Company in the late fall of 1916. He remained with that company until April 1, 1917, and then went with the Falls Rubber Company of Cuyahoga Falls, Ohio. At that time the Falls Company had no chemical laboratory and it was necessary for Kratz to organize one. Having done that, he proceeded to make some more DPG (Vol. I, p. 360-1, Q. 102-3).

In August, 1917, Kratz received an inquiry from a friend who was engaged in the sale of automobile tires in Akron. This inquiry was for 1,000 inner tubes of a special grade to compete with a cheap tube then on the market (Vol. I, p. 361-4, Q. 103-114). Immediately Kratz made an investigation to determine how he could make the tubes for sale at that low price and in that investigation he developed the formulae which appear on Exhibit S (Vol. II, p. 957).

The first of these three formulae designated "#62" was not used, the second designated "#63" was found to be more satisfactory, and the third one, designated "#63 mod." was adopted for commercial manufacture and "went into the factory" as a regular recipe under the designation of "T#8" (Vol. I, p. 365-6, Q. 120).

The two respects in which "#63" and "#63 mod." differ are important. The former includes one part of an accelerator known as "Mannose R" and the latter includes none of that substance; and another accelerator known as mag-

nesia is in both formulae but in different amounts, one part in the former and three parts in the latter.

At the time this work was under way, Kratz had on hand a supply of DPG amounting to about 30 grams (Vol. I, p. 396, Q. 258) and he decided to use it, as far as it would go, in the manufacture of these 1,000 tubes. This was done and about 300 of the 1,000 tubes were made with DPG (Vol. I, p. 368-9, Q. 134-5). When the supply of DPG which Kratz then had was exhausted, the remainder of the 1,000 tubes were made in accordance with formula "#63 mod." which in the factory was known as "T #8."

In making these 300 tubes with DPG as the accelerator, the formula used was "#63" with no Mannose-R, and with 0.2 parts of DPG. In other words, it was formula "#63" with 0.2 parts of DPG substituted for the 1 part of Mannose-R. Another statement of the same thing is that the formula was "#63 mod." with 0.2 parts of DPG included and with the magnesia content reduced from 3 parts to 1 part. This is indicated on Ex. S by the pencil notation at the right opposite "Mannose R" and the penciled square around the "1" indicating the Mannose R in formula "#63". The pencil notation in full is:

"Lagos P —2.0
M or Diphig —0.2"

"Lagos P" is an old factory name for thio and "M or Diphig" means monophenylguanidine or diphenylguanidine (Vol. I, p. 366). This pencil entry records what Dr. Kratz proposed to use in place of 1 part of Mannose R and in combination with 1 part of magnesia as the accelerator. As a matter of judgment and experience, he thought that 2 parts of thio (Lagos P) substituted for the 1 part of Mannose R would, together with 1 part of magnesia, produce the accelerating effect he desired and he knew from his work at Norwalk and the table he prepared as a result of that work that 0.2 parts of DPG would have the same accelerating effect as 2.0 parts of thio (Vol. I, p. 369, Q. 136-7; p. 393, Q. 244).

Ex. S did not go into the factory as the instruction to the workmen who would prepare the rubber for these tubes; instead, a card on which was written the formula designated "#63 mod." went into the factory (Vol. I, p. 364-5, Q. 114-120).

When the rubber for the first batches of tubes, approximately 300, was being prepared, Kratz himself went into the factory taking his supply of DPG with him and he himself introduced the DPG into the mix. He told the man who was preparing the mixture from the card giving the "#63 mod." formula to reduce the proportion of magnesia from 3 parts to 1 part, and, as the mix thus prepared was being milled, he himself put the requisite amount of DPG into it (Vol. I, p. 361; p. 366). This continued through probably two batches of rubber, sufficient to make about 300 tubes, and thereafter, the supply of DPG having been exhausted, the further procedure in the making of the 700 tubes was in exact accordance with the "#63 mod." formula, no DPG being used and the amount of magnesia being 3 parts instead of 1 part.

The 1,000 tubes thus made were shipped to the Rubber City Clearing House of Akron, Ohio, operated by a personal friend of Dr. Kratz, and the sale is proven by the papers in evidence as Exhibit T (Vol. II, p. 958-960) produced from the files of the Falls Rubber Company. The "Memorandum Shipping Order" was written by Dr. Kratz himself (Vol. I, p. 362, Q. 109) at the time of taking the order in the course of a telephone conversation with his friend and was O.K'd for shipment by the President of the Falls Company (Vol. I, p. 362, Q. 110). The other two papers in Exhibit T give the dates and quantities shipped and other data.

The fact that DPG was used in the manufacture of 300 of these 1,000 tubes was known only to Dr. Kratz so on that specific point corroboration by other witnesses was impossible. One other witness, Moore, who was then in the employ of the Falls Company, knew of the manufacture of the 1,000 tubes and tested the composition that was used in their manufacture (Vol. II, p. 1015-8). The test sheet that he made out

to record the results of his work is in evidence as Exhibit U (Vol. II, p. 961). It is dated August 28, 1917, three days after Kratz' formula sheet, dated August 25, 1917, and it identifies the composition by the same number as that used by Kratz on the formula sheet.

It has been suggested that the notation of DPG in pencil on Kratz' formulae sheet may not have been put on the sheet at the time when the other figures were put there. But Kratz said it was put there in the course of his work, that it was put there by himself, that it was put there to indicate that he used DPG in the tubes, and that he did use DPG in the manufacture of part of the 1,000 tubes.

The pencil entry on the formulae sheet reads "M or Diphig. 0.2." Kratz stated that this meant 0.2 parts of monophenylguanidine or diphenylguanidine. These two substances he knew from his Norwalk work had equal accelerating value and he said he would have used monophenylguanidine but for the fact that he did not have any (Vol. I, p. 393, Q. 246); and that what he did in fact use was diphenylguanidine (Vol. I, p. 361).

The amount of DPG used in these tubes was small, but DPG was used, and the cure was made in 35 minutes, and when the supply of DPG was exhausted it was necessary to triple the quantity of the other accelerator, magnesia, which was used to the extent of 1 part in the "No. 63" formula and then increased to 3 parts in the formula "No. 63 Mod." The very fact that Kratz's supply of DPG was limited probably made him use it in as small a proportion as would suffice. The actual amount of DPG namely, 0.2 parts, is equal to about 0.06% on the rubber content of the formula. This percentage is a close approximation of the proportion of DPG given in the Kratz paper, which is 0.075. Kratz used the DPG in that small amount because he knew from his Norwalk work that DPG was an "excellent accelerator" and he was guided in the selection of the proper amount of this "excellent accelerator" by the amount of "Mannose R" he had used in trying out formula # 63. Furthermore the tests

made and the samples produced by the witness McWhorter show that the amount of DPG used by Dr. Kratz was very effective (Vol. I, p. 424-438). Also, Exhibit G (Vol. II, p. 846-9) shows that this plaintiff considers DPG to be "very active when present in very small amounts" and mentions specifically the use of 0.12% in a blooming tube stock such as that used by Dr. Kratz.

It might be inquired why Dr. Kratz did not make more DPG and use it in all of the 1000 tubes and in the other products of his plant. The answer is that it would have been uneconomical because the only method of making DPG then known to Kratz or to anyone else, so far as we are aware, was the so-called laboratory method by which DPG is produced at a cost altogether too high to make its use on a large scale permissible. This is stated in the Weiss patent in suit. (Lines 31-36.) It was only when methods for the production of DPG in quantity at low cost were invented some years later that commercial use of DPG became a possibility. Here is the entire explanation for the fact that commercial manufacture of all kinds of rubber goods with DPG did not start at least as early as 1916 and 1917 and continue from then on indefinitely. It was only the lack of a commercial process of making the accelerator in large quantities and at a reasonably low price that deferred the day of commercial manufacture of rubber goods with DPG. As counsel for plaintiff have said in briefs in this suit, the idea of using DPG as an accelerator was of no value until a process of making it economically was devised; without this process, they said, Weiss's "vulcanization discovery was useless".

In the foregoing discussion we have not mentioned plaintiff's rebuttal witnesses, Shaw and Hoffman. Their testimony is so inconsequential that comment on it is scarcely necessary. They undertook to testify solely from recollection with reference to events that were eight years old, events which were so exactly in line with routine work they were doing day after day that there is no reason whatever why the

events should have impressed themselves on their recollection even if they had known about them at the time, and it may very well be that they had no occasion to know anything about them.

For a period of three or four years, Shaw was engaged day after day in measuring out certain quantities of certain ingredients of a rubber batch as called for by a sheet of instructions that was put before him, dumping the measured quantities into a receptacle and starting the receptacle on its way into the mill-room. Even if he was the man who measured out the ingredients for the rubber compound that went into the tubes for the Rubber City Clearing House, it is hardly believable that he would remember after the lapse of eight years that on one of the innumerable occasions when he performed this routine operation, Dr. Kratz told him to reduce the quantity of magnesia from the amount called for by the paper he had before him to one-third of that amount; (Vol. I, p. 366) and, of course, it may well be that on the day when this particular rubber compound was measured out, Shaw was ill or temporarily absent for any one of a variety of possible reasons.

Hoffman was one of the men operating a mill to effect the mixing of the ingredients of rubber batches and Dr. Kratz said it was he, Kratz, who put the DPG into the batch at the mill (Vol. I, p. 382, Q. 194). There were five such mills and no one has undertaken to say at which mill this particular rubber compound was mixed or what workman was operating that mill (Vol. I, p. 383, Q. 196).

Aside from these considerations, the character of the testimony of these two men is such that it carries no conviction.

We submit, therefore, that there is no occasion whatever for questioning any item of the history of the manufacture and sale of these tubes as related in detail by Dr. Kratz, particularly so in view of the conclusion of the trial Judge as to Dr. Kratz's credibility (Vol. I, p. 698).

Kratz's DPG Investigations at the Falls Co.

After the manufacture and sale of the 1,000 tubes, some months elapsed before Kratz's next work with DPG, because his assistant, Mr. Moore, left, and it was some months later that Mr. Flower joined the staff of the Falls Co. Then Kratz conducted the investigation required for the preparation of the paper which he read before The American Chemical Society (Vol. I, p. 374, Q. 158).

In "Table 1" of the paper the accelerators listed are the same as those in the Norwalk report but the tests of those accelerators were repeated. In the tests at the Norwalk Co., the standard formula used included zinc oxide, and Kratz wished to check up the Norwalk figures by reference to similar tests using a standard formula which did not include zinc oxide (Vol. I, p. 374, Q. 157).

The final figures representing the relative accelerating values as they appear in the paper may be compared with those in the Norwalk report, and it will be apparent at once that the tests at the Falls Co. gave practically the same results as the earlier ones at Norwalk. To compare them, it is necessary to multiply all of the figures given in the table of the paper by 3.5, for the basic figure in that table is 1.00 for aniline and in the Norwalk report it is 3.5, as is done in the following table:

	Activities given in Table in Paper	Figures in Paper multiplied by 3.5	Norwalk Tests
Aniline	1.00	3.5	3.5
Urea	0.250	0.875	0.33
Thiourea	0.300	1.050	1.0
Monophenylthiourea	0.450	1.575	1.5
Diphenylthiourea	0.850	2.975	3.0
Monophenylguanidine	0.075	0.262	0.25
Diphenylguanidine	0.075	0.262	0.25
Triphenylguanidine	0.500	1.750	1.75

This shows how closely the two sets of figures correspond; there is no difference of any consequence except in the case of urea, the explanation for which is unimportant in this connection.

Prior Invention and Prior Knowledge.

These facts making up the history of Kratz's work fully sustain the defenses of prior invention and prior knowledge. Whatever invention there was in ascertaining the serviceability of DPG as an accelerator was achieved in its entirety by Dr. Kratz at Norwalk in 1916.. The so-called invention was completed by Kratz at that time. Because of that, any one who made the invention thereafter was not the first inventor, and if a patentee is not the first inventor his patent is void. This Court has reiterated that proposition at brief intervals over the past 100 years, the most recent instance being in Alexander Milburn Company vs. Davis-Bournonville Company, 270 U. S. 390-402.

Dr. Kratz made DPG in the fall of 1916 at Norwalk in the manner fully described in the official record prepared by him, and he used that DPG as an accelerator in the proportion of 1½%, .5%, .35% and .25% of the rubber in making successive groups of rubber test-slabs (Vol. II, p. 952-6). The mixture in which he used the DPG consisted of 200 parts of rubber, 200 parts of zinc oxide, 10 parts of sulfur, and the DPG, and the mixture was cured in 60 minutes at a temperature corresponding to a pressure of 50 pounds of steam, all as shown by the record he made (Vol. II, p. 952). This was a very usual formula for a rubber batch and the time and temperature of the cure were also quite usual (Vol. I, p. 350, Q. 54-5). By this procedure he determined that with this time and temperature of cure and this proportion of sulphur, it was best to use .25% of DPG, the best rubber being produced from the mixture designated "V" on the record of these tests (Vol. II, p. 952) consisting of 200 parts

of rubber, 200 parts of zinc oxide, 10 parts of sulphur and 0.5 parts of DPG (Vol. I, p. 351-4, Q. 63-8).

This was a complete demonstration of the accelerating value of DPG within the rules laid down by this Court.* The rubber produced was as well cured as a similar mix in which 3.5% of aniline or 3% of thio was used as the accelerator; this fact is stated on the next page of the record (Vol. II, p. 953), and all rubber men of that day knew how to use aniline and thio as accelerators (Vol. I, p. 214, Q. 78-82; p. 229, Q. 6-8; p. 298, Q. 11; p. 411, Q. 337; and Ex. L, Vol. II, p. 920-3). Thus the demonstration of the value of DPG as an accelerator was complete in all respects and because there was this complete demonstration, the act of invention was complete and any later inventor was not the first inventor.

The authenticity of these records and the reliability of Dr. Kratz's testimony about them has never been questioned.

Furthermore, this plaintiff is barred from raising any question here as to the sufficiency of these records and Dr. Kratz's testimony about them as proof of completion of the invention, because records and testimony of the same character, though much less convincing, are presented by plaintiff in proof of completion of the invention by the patentee at a later date.

There is no possible theory on which it can be asserted that the evidence before the Court *does not* show completion of the invention by Kratz at Norwalk in 1916 and *does* show completion of the invention by Weiss at Republic in 1918 or 1919. These two men, Kratz and Weiss, occupied identically the same position in two different rubber plants; they both worked in the laboratories of those plants; their work with DPG included making test-slabs of rubber in a testing machine; and both men recorded their tests in official record books of their companies. The difference between them is that Kratz's work moved steadily forward to a definite and useful conclusion, expressed mathematically in

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* *Coffin* vs. *Ogden*, 18 Wall. 120-124; *Egbert* vs. *Lippmann*, 104 U. S. 333-337; *Clark Thread Co.* vs. *Willimantic Co.*, 140 U. S. 481-489.

terms of relative accelerating values of different substances, whereas Weiss's work lacked all the elements of continuity and progress and had achieved nothing at the time the Kratz paper was published.

The views we have expressed in the foregoing coincide precisely with the conclusions reached by the Court of Appeals for the Second Circuit in the *National* case and expressed so pointedly in its opinion. The opinion includes the following:

> "Dr. Kratz invented whatever Weiss did before the latter had any concept of invention. Therefore Weiss was not the 'first, sole, true and original inventor', as the bill asserts" (292 Fed. 558).

The opinion goes on to state that even if it were accepted that Weiss did all that he ever said he did and at the times when he said he did it, still:

> "we find on what we regard as the clearest evidence that Dr. Kratz did the same thing in 1916" (292 Fed. 559).

Furthermore, there was *knowledge* of the alleged invention prior to the earliest date claimed for Weiss which requires that the Weiss patent be held invalid. The Patent Statute provides for patents for inventions which are "not known", and the fact is that what Weiss describes as his invention was known. It was known to Dr. Kratz from the fall of 1916 on. He has testified to that in detail and supported his testimony with records, and neither the records nor Kratz's credibility have been questioned. That alone is sufficient, for this Court has held repeatedly that knowledge by a single individual is sufficient. But the knowledge was not limited to a single individual. Certainly it was shared by Dr. Russell, the associate and superior of Dr. Kratz in the Norwalk Company. He and Kratz have both testified that Russell had full knowledge of the value of DPG (Vol. I, p. 355 and Vol. II, p. 1019-1023) and no one has questioned

the reliability of the testimony of either. So though knowledge by one person is sufficient under the authorities, this knowledge was possessed by two that we know of. One may reasonably assume that what Dr. Kratz did at Norwalk and recorded in the official records became known to the officials of the company or at least to such of them as were directly interested in the conduct of the business. But the requirement of the law in establishing this defense of prior knowledge was more than fulfilled when it was shown that the knowledge was possessed by Dr. Kratz and Dr. Russell.

In *Coffin* vs. *Ogden*, 18 Wall. 120, this Court said:

> "The prior knowledge and use by a single person is sufficient. The number is immaterial."

Also, in *Egbert* vs. *Lippmann*, 104 U. S. 333, this Court said on page 336:

> "We remark, secondly, that, whether the use of an invention is public or private does not necessarily depend upon the number of persons to whom its use is known. If an inventor, having made his device, gives or sells it to another, to be used by the donee or vendee, without limitation or restriction, or injunction of secrecy, and it is so used, such use is public, even though the use and *knowledge of the use may be confined to one person.*" (Italics ours.)

Also, in *Hall* vs. *Macneale*, 107 U. S. 90, this Court said at page 97:

> "The construction and arrangement and purpose and mode of operation and use of the bolts in the safes were necessarily known to the workmen who put them in."

In the recent case of *Alexander Milburn Co.* vs. *Davis-Bournonville Co.*, 270 U. S. 390, the patent in suit was held to be invalid solely by reason of knowledge by another applicant for patent shown by his application filed prior to the filing of the application for the patent in suit. The first applicant described in his application a construction em-

bodying the invention of the patent in suit but made no claim to that construction and asserted no particular value or merit for it. However, the mere fact that he described such a construction was held to establish knowledge by him of the invention of the patent in suit at a time prior to the earliest date which the patentee of the patent in suit had established. The Court said (270 U. S. 401):

> "We see no reason in the words or policy of the law for allowing Whitford to profit by the delay and make himself out to be the first inventor when he was not so in fact, when *Clifford had shown knowledge inconsistent with the allowance of Whitford's claim*". (Italics ours.)

See also:

Kendall vs. *Windsor,* 21 How. 322.
Pennock vs. *Dialogue,* 2 Pet. 1.
McClurg vs. *Kingsland,* 1 How. 202.

Finally, assume for the purpose of extending the argument further, that all Kratz did at the Norwalk Rubber Company in 1916 and at the Falls Rubber Company in 1917 fell short of completion of the invention. Even so, there can be no question but that conception of the idea of using DPG as an accelerator is proven by the official record of the Norwalk Company in Dr. Kratz's handwriting and dated by him, for that record gives the quantities of the ingredients, including DPG, used in the rubber mix and no one has ever questioned its authenticity. This conception of the invention prior to the earliest date claimed by Weiss should be considered in conjunction with the reading of the Kratz paper in September, 1919, and the printing and distribution of that paper in April, 1920.

The reading of the Kratz paper was a step toward publication just as is the filing of an application for patent, and the subsequent printing and distribution of the paper was a publication just as is the issuance of a patent. Both are publications; they differ only in that one is publication with an altruistic motive, whereas the other is publication for a

consideration, namely, the monopoly covered by the patent. Thus, at every step in the evolution of the invention from the initial conception of the idea, through successful trial, to full publicity, Kratz was always prior to Weiss. Kratz did everything Weiss did and more besides, and in every instance he was ahead in point of time, except that Kratz, unlike Weiss, did not attempt to monopolize the use of DPG by obtaining a patent therefor.

The diligence of one man or the other does not have to be considered because no question of diligence is presented when one man was first both in the conception of the invention and also in giving it to the public. Furthermore, it would obviously be impossible for plaintiff to argue that Weiss was diligent and Kratz was not.

The conclusion reached by the Circuit Court of Appeals for the Second Circuit in the *National* case on this aspect of the case is expressed as follows (292 Fed. 559):

> "It follows that, taking this patent at the patentee's own value, and accepting, for purposes of decision only, his view of what he invented and how he embodied that invention, Dr. Kratz and associates were ahead of him in every step. Therefore, on this record, they were the inventors (if any patentable invention exists), and not Weiss.

See also *Twentieth Century Mach. Co.* vs. *Loew Mfg. Co.*, 243 Fed. 373, 386, in which the Court of Appeals for the Sixth Circuit said:

> "And as matter of law we see no difference between the right of a defendant to show the time of conception of *an unpatented anticipating device*, as also diligence in reducing it to practice, and the right of a plaintiff to do this in respect of a patented device. We conceive this to be the necessary effect of section 4886 and section 4920, paragraphs second and fourth, of the Federal Revised Statutes; and these statutory provisions seem to have been substantially complied with in the second and third paragraphs of the answer when read in connection with the eighth paragraph. It cannot be that a patentee

can escape the defenses either that he 'unjustly obtained the patent for that which was in fact invented by another, who was using reasonable diligence in adapting and perfecting the same' (second par. § 4920), or that 'he was not the original and first inventor or discoverer of any material and substantial part of the thing patented' (fourth par. Id.), *whether the anticipating object is patented or unpatented.* The statute makes no distinction in this regard; it is the fact of prior invention, not the nature of the right under which the invented device is held, that the statute treats as a defense. As Judge Colt said in Automatic Weighing Mach. Co. *vs.* Pneumatic Scale Corp., *supra,* 166 Fed., at 301, 92 C. C. A., 219 (C. C. A., 1):

"No sound reason has been advanced why the doctrine of diligence should not apply to a patentee as well as to an inventor who has not secured a patent. On the other hand, any such distinction in favor of patentees is not in harmony with the patent laws." (Italics ours.)

See also

Lowe vs. *Pacific Gas & Elec. Co.,* 2 Fed. (2d) 157.
Automatic Weighing Machine Co. vs. *Pneumatic Co.,* 166 Fed. 288, C. C. A., 1st Cir.
Christie vs. *Seybold,* 55 Fed. 69, C. C. A., 6th Cir.

Secrecy and Abandonment.

Plaintiff attempts to make answer to the proposition that Dr. Kratz completed the invention at Norwalk in 1916 and that he and Dr. Russell had knowledge of the invention from that time on, with a claim of secrecy and abandonment. As to secrecy, the fact is that Dr. Kratz's work with DPG at Norwalk in 1916 was recorded in the official records of the laboratory of that company. All this work was known in its details to his immediate superior, Dr. Russell (Vol. I, p. 355-6, Q. 75-9; Vol. II, p. 1019-1023), and, of course, the officials of the company had access to these company records. Also, Dr. Kratz left the employ of the Norwalk Company a few months after doing this work with DPG, and

entered the employ of the Falls Rubber Company in Ohio, and when he went there he took with him his own cards (Vol. II, p. 940-51) on which were recorded exactly the same information as appears on the Norwalk reports; in fact, the cards formed the notes from which the permanent record was prepared (Vol. I, p. 349, Q. 49).

So from this much alone, it is apparent that the completion of the invention by Dr. Kratz at Norwalk in 1916 spread at once to Dr. Russell in the Norwalk Company and then to the Falls Rubber Company out in Ohio, and in both companies the information was available at least to the officials if not to other employees. Certainly it spread to some of the other employees of the Falls Co., for in the summer of the following year we find two of these employees collaborating with Dr. Kratz in the preparation of his paper.

But most important of all, the publication of the Kratz paper was publication of the most thorough kind of the item of information which is of importance here, namely, that DPG is far more active as an accelerator than TPG.

In such circumstances it seems to us to be absurd for one to even raise an issue of secrecy. There is no evidence before the Court of any effort on the part of anyone to maintain in secrecy the fact that DPG was a particularly active accelerator, and if there were such evidence it should pale into insignificance before the actual fact that the idea did spread to some extent and then was made public to all the world.

As to abandonment, there can be no abandonment of a completed invention such as will permit some other inventor to patent and monopolize that invention. The only possible abandonment of a completed invention is abandonment to the public. That is so because it is a fundamental requisite of a valid patent that the patentee shall be the first inventor, and if the invention was completed by some one else at an earlier date, then the patentee is not the first inventor and his patent is void.

In view of what Kratz did with DPG, his work at Norwalk in 1916, the comprehensive and informative records he made of that work, taking a copy of that record with him to

his new employment, making use of DPG in commercial manufacture there, making check-up experiments preparatory to writing his paper, and then writing, reading and publishing the paper, it would seem illogical to a degree to assert that he abandoned the invention at any time in that series of events. But if there was any abandonment at any stage of the way, it was abandonment of a completed invention, completed in 1916 at Norwalk, and any such abandonment was abandonment to the public which made the invention open for use by anyone.

Evans vs. *Eaton,* 3 Wheat. 454, 483, 513.
Consolidated Fruit Jar Co. vs. *Wright,* 94 U. S. 92.
Planing Machine Co. vs. *Keith,* 101 U. S. 479.
Pickering vs. *McCullough,* Federal Case No. 11,121, 3 Ban. & A. 279, (affirmed 104 U. S. 310).
Shoup vs. *Henrici,* Federal Case No. 12,814, 2 Ban. & A. 249.
Harbridge vs. *Perrin,* 295 Fed. 927.

Plaintiff claims to find support for its allegation of secrecy in the cross-examination of Dr. Kratz and this will have to be discussed at length, particularly in view of the comment thereon by the Court of Appeals in this case. The answer to which plaintiff attaches most consequence is that given by Dr. Kratz to x-Q. 329 (Vol. I, p. 409). Detached from all else in the case, this answer might seem at first to have some significance, but in fact it has not, and when taken with what precedes and follows so as to understand accurately the idea Dr. Kratz meant to convey, it becomes of no consequence. Practically no attention was paid by any one to this portion of Dr. Kratz's cross-examination up to the time of the argument in the Court of Appeals when some reference was made to it and the presiding Judge of the Court of Appeals, considering the answers to cross-questions 329 to 334 detached from all other testimony, and finding himself unable to understand the technical matters involved in this suit, (Vol. II, p. 1037) gave to those answers a meaning far removed from anything Dr. Kratz intended.

In the first place, when the matter under consideration is the effect of a prior publication in a patent suit, testimony

of the author of the publication as to what he intended to disclose or what he intended to withhold is not only unimportant but is irrelevant (*Badische Anilin etc.* vs. *Kalle & Co.*, 104 Fed. 802-8, C. C. A., 2d Cir.). The only matters of consequence are what is contained in the paper and what a man skilled in the art would understand on reading the paper, and no amount of discussion from any source can ever take out of the Kratz paper the statement that DPG is many times as active as an accelerator as TPG, which is all that the Weiss patent in suit says.

In the second place, Dr. Kratz distinctly stated that his purpose in reading the paper was to depart from and try to break down the secrecy that had theretofore prevailed in the rubber art in connection with the use of accelerators. Not only was this his purpose and stated by him to have been his purpose, but also the fact that he accomplished this purpose is testified to by one of the principal witnesses for *plaintiff*. Dr. Kratz said he felt

> "* * * it was time some one should put some actual data on accelerators into a publication and I talked that over with Mr. Flower and we decided that we should put some of our information into the form of a paper to be presented at the next meeting of the American Chemical Society" (Vol. I, p. 375, Q. 159).

Also, he said that his paper

> "was the first open and above board discussion of accelerators that had been presented until that time" (Vol. I, p. 409, Q. 328).

And plaintiff's witness Daniels said that rubber chemists had refrained from publishing information about accelerators up to September, 1919, that Dr. Kratz's paper marked a reversal of that policy, and that since the reading of the Kratz paper rubber chemists have been much more free in giving out information (Vol. I, p. 216-7, Q. 95-6). Daniels went even further. He said that never before had he heard so interesting a paper as the one read by Dr. Kratz, nor one which gave as definite information (Vol. I, p. 216,

Q. 93-4). So instead of adhering to what had become a rule among rubber chemists, Dr. Kratz determined deliberately to depart from that rule in the hope that his action would cause others to follow, and be carried out his purpose by reading a paper which even plaintiff's witness characterized as the most interesting and informative up to that time. It is evident, therefore, that instead of secrecy, there was a revulsion against secrecy, and a determination to depart from secrecy, and an actual and effective departure from secrecy.

In the third place, when Dr. Kratz's testimony is considered in its entirety and is understood, it is apparent that it does not support plaintiff's claim of secrecy in this case, as we shall now show.

What Dr. Kratz said he did *not* give out were the factory compounds of the company by which he was employed, *i. e.*, the detailed formulae giving all the ingredients, and the amount of each ingredient. Those factory formulae a competitor could "transpose directly for practical purposes" and those he said he did not give out (Vol. I, p. 409, Q. 329). Giving out those factory formulae, he said, might be considered by his employers as "giving away company secrets" (Vol. I, p. 409, Q. 327). But, he said he gave out "two tables of substances which we pointed out were excellent accelerators" (Vol. I, p. 410, Q. 332). He said his idea was to "give enough information so that any reputable chemist would be guided by the information in the paper" (Vol. I, p. 409-410, Q. 329).

Those few quotations from his testimony show the line of demarcation precisely. The exact detailed practice then being followed within the plant of the company where Kratz was employed, he did not include in his paper because he felt he should not; but he had decided in his own mind to try to bring about an "open and above board discussion of accelerators" (Vol. I, p. 409, Q. 328) so he gave out "two tables of substances which he pointed out were excellent accelerators" (Q. 332) and a typical recipe in which he had used those accelerators (Vol. II, p. 837 and 838).

In that situation, the only question that can arise is whether or not the item of knowledge under discussion in this suit is included in what was given out. On that there seems to us to be no room for question for the paper contains not only the unmistakably clear statement of

> "the great difference in activities of mono- and di-phenylguanidines, when compared with that of tri-phenylguanidine" (Vol. II, p. 830),

but also figures expressing exactly the magnitude of the difference (Vol. II, p. 838).

That, we think, should dispose of the matter. But there is more.

Finished rubber articles differ in quality over a wide range and through almost infinite gradations; for instance, the extremely tough, relatively inflexible, and inelastic automobile shoe, on the one hand, and the frail, flexible, elastic inner tube on the other. Also, raw rubber exists in various qualities, the different qualities differ in cost, and the filling materials differ greatly and variously affect the properties of the finished product. A particular factory formula for a rubber compound takes into account all of these variations in raw material, mixture and desired qualities of finished product. It is available for direct transposition for practical purposes only to produce a particular individual product. Because of its very particularity, a factory formula is less enlightening than a typical recipe, such as the recipes given by Kratz in his paper and by Weiss in his patent.

That is generally true with respect to disclosures of new properties or new availabilities of materials. It is generally more enlightening to disclose a typical recipe coupled with the statement of the principle, than it is to disclose any number of factory formulae. In that situation the most serviceable thing that Kratz could do was to state the fact of the great activity of DPG and give a recipe by which its great activity could be demonstrated, and that is precisely what he did do (Vol. II, p. 830, 837 and 838).

Years later when Weiss was confronted with the same situation, *i. e.*, disclosing the value of DPG as an accelerator, he did identically the same thing, namely, state that DPG is a particularly active accelerator, and give a recipe in which it may be used (Vol. II, p. 718).

Just such a situation as this was before this Court in *Minerals Separation* vs. *Hyde*, 242 U. S. 261, 271, in which the Court said:

> "The composition of ores varies infinitely, each one presenting its special problem, and it is obviously impossible to specify in a patent the precise treatment which would be most successful and economical in each case".

The qualities desired in the various rubber articles now in common manufacture vary as infinitely or more infinitely than the composition of ores. Each one presents a special problem in devising the factory formula best adapted to the production of that article.

In that situation, if Kratz in his paper or Weiss in his patent had attempted to give a factory formula accompanied by a specification of the raw rubber used and the quality of the finished article produced, such a formula would have been of *direct practical value* only to some man who perchance wanted to use the same rubber and produce a finished article of the same quality. It would have been of *real value* as a disclosure only in so far as it furnished a key to experimentation with the standard rubber laboratory machines for making test-slabs and testing them, whereby any rubber chemist could, by following standard laboratory routine, arrive readily at the precise formula he wanted to use to meet his specific and individual conditions. As Dr. Kratz said, even if he had given an exact formula for each of the substances he mentioned in his paper, he would have assumed that those who heard him "would investigate for themselves" (Vol. I, p. 411, Q. 338). But it was far better to give a table of relative values, for with them any rubber chemist could substitute the proper amount of a different accelerator in any one of his own factory formulae.

Even the circular of the plaintiff company distributed by it through the rubber industry (Vol. II, p. 846-9), though it goes far beyond the bare recipe given in the Weiss patent, makes no pretense of giving a formula which one could "transpose directly for factory purposes". It gives what it designates as "Type Compounds for Various Rubber Articles" (P. 847), and, in connection with them, names a considerable number of other ingredients and variables which the factory man would have to determine for himself with reference to what he wanted to use, what quality he wanted to produce, and what cost limitations he had to meet.

A rubber chemist furnished with a copy of plaintiff's circular giving these "Type Compounds" would not use them for factory manufacture. But he might use them and was expected by plaintiff to use them as a guide in adapting the numerous standard formulae of his own plant to the use of the accelerator recommended in the circular. Not only is this made plain by the circular itself, but also it was so stated by one of plaintiff's witnesses. Mr. Woodward, the Vice-President of the plaintiff Company, said these "Type Formulae" were "of general interest, not specific interest" (Vol. I, p. 248, Q. 51), by which he meant identically the same thing that Dr. Kratz meant when he said rubber chemists would not attempt and were not expected to attempt to use the information and recipe given in his paper by transposing "directly for factory purposes".

DPG by Dr. Kratz and the Falls Rubber Company.

We maintain also that the tubes made by Kratz at the Falls Company by the use of DPG as an accelerator and sold by the Falls Company in its regular commercial business in September, 1917, far more than two years prior to the application for the patent in suit, (*ante* pp. 67-72) constitute an instance of prior use of the claimed invention which invalidates the patent.

So far as concerns the testimony of witnesses, the use of DPG in the manufacture of those tubes and the sale of the

tubes in 1917, rests upon the testimony of Dr. Kratz alone. As we have pointed out, the DPG used in those tubes was put into the rubber mix by him and its use as an accelerator in vulcanizing the rubber of those particular tubes was known only to him. Also, we recognize the fact that proof of a prior use which suffices to invalidate a patent usually requires the testimony of more than a single witness. In this instance, however, the facts presented fully warrant the conclusion that the tubes were made and sold as Kratz said they were, and that conclusion requires that the patent in suit be held to be invalid.

The Norwalk report of 1916 (Ex. R) shows that long before the tubes were made, Kratz had a full comprehension of the serviceability of DPG as an accelerator for he had determined its exact accelerating value by reference to such well-known accelerators as thio and aniline. Also, there is no reason for doubting that he actually had some DPG in 1916 for his report shows how he made it at Norwalk and he said he made some more at the Falls Company (Vol. I, p. 361-2, Q. 103-4). Then there is the formula which was used in the preparation of the rubber compound for these tubes (Ex. S). It is in Kratz's handwriting and shows DPG to be one of the ingredients. Then there is the order for the tubes (Ex. T) made out by Kratz himself and O.K'd by the President of the company. Then there are the shipping orders of the company showing the shipment of the tubes (Ex. T). Also, there is the test sheet (Ex. U) of Kratz's assistant, Moore, who said that the tests were made by him and that the test sheet was made out in his handwriting and the sheet identifies the composition tested by the number given it upon the formula sheet.

The tubes were not the regular tubes of the Falls Co., but were a special lot of low-priced tubes made in competition with another commercial brand then on the market, as appears from the entry made by Kratz on the sheet giving the formulæ and as pointed out by Kratz in his testimony (Vol. I, p. 361-3, Q. 103-114). Kratz was the only one in charge of the compounding, he had to work out the compound himself, he added the DPG to the mixture himself, (Vol. I, p. 382, Q.

194), he took the order himself after investigating and determining that he could make the tubes at a competing price, he knew of the actual shipping of the tubes, and he knew that the tubes were satisfactory to the purchaser (Vol. I, p. 371, Q. 149-150).

These circumstances and facts were well calculated to leave an indelible impression on Kratz's memory. The matter was one for which Kratz himself was personally responsible from the time of the preliminary inquiry, through the investigation of the compounds, the taking of the order over the telephone, the mixing of the ingredients used, the addition of the DPG which Kratz himself had made, the shipping of the tubes and the satisfaction of the customer with the purchase. The corroboration of Kratz's oral testimony by records in his own handwriting, by the testimony of Moore, by the record of the physical tests, and by the sales records, was all the corroboration available, but, taken with Kratz's testimony, it is sufficient to compel belief.

In addition to all this and by way of further circumstantial corroboration, it was only a few months after these tubes were made by the use of DPG that Kratz made the series of tests of various accelerators, including DPG, which served as the basis for his paper, and the results of his tests and the tests he made at Norwalk were embodied in the paper read by him before an assemblage of the principal rubber chemists of the country.

On this point of the sufficiency of the proof of the tubes, the sole question is whether or not the Court believes, from the testimony of Kratz and Moore and the documents we have referred to, that Kratz did in fact do what he said he did in the manufacture and sale of the tubes. It is solely a question of whether or not the Court believes the tubes were made and sold as stated, and on this array of documentary evidence and corroborating circumstances it seems to us that there is no reasonable ground for doubt.

Moreover, plaintiff does not question Dr. Kratz's veracity. It offers nothing in contradiction of what he said or in disparagement of what he did. On the contrary, plaintiff has

stated specifically that it does not reflect "in any way on his credibility". In addition to that, the Judge of the District Court who observed Dr. Kratz on the witness stand and who listened to his extended examination, paid tribute to him as a man of high character whose word should be accepted without question.

The District Court said:

> "There is some documentary evidence which tends to confirm this claim of use, but even if there were none we should not feel justified in rejecting it. To do so would be to impute wilful falsehood to Dr. Kratz, and neither his interest in this case nor his manner and appearance upon the stand was such as to furnish any foundation for that imputation. His knowledge of DPG and the general circumstances make the use of it as an accelerator quite probable" (Vol. I, p. 698).

On practically identical evidence, the Court of Appeals of the Second Circuit in the *National* case said:

> "When we perceive how closely his acts in 1916 correspond with his essay of 1919, we believe his evidence, though uncorroborated, that in 1917 he made rubber tires and sold them, using DPG as the accelerator; and this is more than Weiss even claims to have done before application filed."

In a somewhat similar situation the Court of Appeals for the Second Circuit said:

> "There is no reason to doubt the testimony of the patentee as to the date of his inventive thought. While it is true that uncorroborated testimony of an inventor is to be accepted with caution * * * yet there is no rule of law that requires rejection of the uncorroborated testimony of an inventor as to the date of his conception." (*Armstrong* vs. *De Forest,* 280 Fed. 584, 590.)

Also, the Court of Appeals of the Third Circuit which rejected this defense without stating its views thereon, said in another case:

> "It is undoubtedly the duty of courts to exercise, as in nearly all cases they are careful to declare, the

utmost caution in scrutinizing and considering the testimony offered to establish a prior use. Courts have frequently taken the ground, under the particular circumstances of the case before them, that where a long time has elapsed since the alleged use, and the fact depends upon the fading recollection of a single witness, that an exhibit of the device or thing actually used must accompany the affidavit. There is, however, no hard and fast rule as to this. In this, as in other cases, the weight and effect of testimony must be passed upon, and a conclusion as to the existence of an alleged prior use will be reached if the evidence thereof is clear and satisfactory to the judicial mind." (*Sipp Electric & Machine Co.* vs. *Atwood-Morrison Co.*, 142 Fed. 149, 154; C. C. A., 3rd Circuit.)

A similar situation was presented in *Tompkins* vs. *N. Y. Woven Wire Mattress Co.*, 159 Fed. 133, 135, in which the Court of Appeals for the Second Circuit held the patent in suit invalid on the testimony of a single witness, saying:

"Is Mr. Prince's statement true? Having in mind the fact that he is an interested witness and that his statements must be established beyond a reasonable doubt, we see no way to avoid the effect of his testimony, unless we are prepared to say that he has committed willful perjury. This we cannot do. Mr. Prince appears on the record to be an intelligent, straightforward, conservative, business man. He was not testifying about events happening so long ago that the memory might well be confused and clouded by the lapse of time and a multitude of intervening events. His testimony was given in 1906 and related to transactions in 1904-5, and it was not contradicted. Though he did not produce a Regis spring he gave the names of a number of dealers to whom the spring had been sold, so that if his statements were untrue it could easily have been discovered by an examination of these persons and the defendant's books. There is nothing astonishing or inherently improbable in Prince's testimony and we cannot disregard it."

Also, in *Riley* vs. *Daniels,* (Fed. Case 11837) Circuit Judge Shipman held a patent invalid because of a prior use established by the testimony of a single witness, saying:

> "The use of satinet wicks by H. K. Sears, in 1836 and 1837, was somewhat experimental, and, if his testimony had been confined to a use in those years, would have been insufficient. But he also testifies that in January and in February, 1862, he sold ordinary tin lamps with flat woolen wicks, which he made himself, to the soldiers of the Union Army in Virginia and in the District of Columbia, and informed and showed the purchasers that woolen wicks could be used in the lamps. His testimony I believe to be true. The important question upon this state of facts is whether, inasmuch as the defendant takes the burden of proof, and must overcome by preponderating testimony the *prima facie* evidence which is furnished by the letters patent, the testimony of a single witness is sufficient to create such a preponderance." * * *
>
> "The evidence should be of such a character as to satisfy the court that the prior invention of the particular article in controversy took place. As there is no improbability from the character of the invention that Mr. Sears might not also have formed a wick from woolen cloth, and as I have no doubt that he did peddle flat woolen wicks in January, 1862, among the soldiers, I am of opinion that the patentee was not the first and original inventor of the patented article, and that the bill should be dismissed."

As to the sufficiency of a single instance of prior use when the proof of it is adequate, there can be no question in view of the decisions of this Court in the cases to which we have referred on pages 77 and 78 hereof.

In such a case of prior use as that presented here, one might reasonably inquire why the prior use did not persist, so that as it continued, more and more people would become familiar with it. In this instance the explanation is complete. Such DPG as Dr. Kratz then had available was exhausted and for him to make more by the methods then avail-

able would have involved an expense out of all proportion. It was far cheaper to use thio or some other accelerator then readily purchasable in quantity at small cost even though it had to be used in a larger proportion. DPG could then be had only in small quantity and at relatively high cost; making it by the so-called laboratory method described in the literature involved a cost beyond the possibilities of commercial manufacture as all agree and as the patent in suit states. Extensive use of DPG had to await the development or invention of a new method of making it which would produce it at a cost comparable with that of other accelerators and eventually that was done by Weiss and others.

But in this one instance, DPG was used in the regular commercial production of tubes for automobile tires and the tubes were sold in the regular course of trade and were found to be satisfactory. Under the authorities cited, such a use is sufficient to invalidate a subsequent patent.

FOURTH DEFENSE.

Weiss is Not an Original Inventor.

Up to this point our discussion has proceeded on the assumption that Weiss conceived the idea of using DPG independently. We say this is not the case. Weiss got the suggestion of the use of DPG as an accelerator from an entry which had been made in the X-book, before Weiss entered the employ of the Republic Company, by Baldwin, a predecessor of Weiss as a chemist of the company. The proof of Baldwin's use of DPG rests upon a certain record, and that record is the very same X-book which Weiss presents in proof of his assertion of invention, the only dated record evidence Weiss has.

This is particularly important in this case because plaintiff's whole claim rests upon proving beyond a reasonable doubt that Weiss made the invention in issue before Septem-

ber, 1919, and because, except for the X-book alone, its proof consists entirely of the recollection of witnesses of events which occurred many years before they testified.

On page 2005 of the X-book, (Ex. 10, Vol. II, p. 731) in the first column, is the record of a test including the use of DPG. The date entered at the bottom of the column is February 22, 1917. The name "DIPHENYLGUANIDINE" is recorded in the column of substances in printing of a distinctive style. The title at the top of the page is inserted in that same printing as "ACTION OF ORGANIC ACCEL."

All the rest of the entries on this page were made by Weiss, as he himself acknowledged (Vol. I, p. 174-5, Q. 417-428). Those entries range in date from June 13, 1918, to February 21, 1919.

This X-book was the official record of the work done in the laboratory of the Republic Company. When Weiss entered the employ of the company in the fall of 1917, there were only a few entries in the book and as he began at once to study the chemistry of rubber in general and accelerators in particular, it must be that he examined with care such entries as had then been made in the X-book.

We maintain that there, in that X-book, right under Weiss's eyes all through 1918, in this book in which he entered many tests of his own, was the record of a test of a rubber compound containing diphenylguanidine as an accelerator. Weiss saw it at the time, he must have seen it, particularly when he made the other entries on the same page; but in the years that elapsed up to 1923 when the *National* suit was tried during which he did a great deal of work with DPG and devised a process of making it, he forgot that the entry of DPG was there in the X-book and imagined that he himself was the first to propose using it.

At the trial, plaintiff's witnesses said this entry in the first column on page 2005, or the essential part of it, was not there at the time when Weiss made the other entries on the page or at any other time while Weiss was in the employ of the Republic Company. This appears in Weiss's answers

to questions 499 to 502 on page 192. The first of those answers is typical of Weiss; in one answer, he said definitely that certain figures were not in the X-book and that it was his recollection that they were not in the book and that he did not recall exactly whether or not they were in the book. Taking all the answers together, one can only say that Weiss denied having any recollection of seeing on page X-2005 in 1918 or 1919 the entry of the test recorded in the first column.

As a matter of fact, this entry was there and was put there by Baldwin in February of 1917. Baldwin was definite and positive in his identification of the X-book and the entries made by him in the early pages of the book (Vol. I, p. 312-5). As to the entries on page 2005, he said that the number 2005, the title "ACTION OF ORGANIC ACCEL.", the reference "(X-2004-C)", the name "DIPHENYLGUANIDINE", all the figures in the first column, the letters "N. G.", and the date "2-22-17" were all put on that page by him, and that he was absolutely certain that he put all of them on that page on or about February 22, 1917.

Baldwin is corroborated by the record evidence of the X-book, the record which plaintiff presents in support of Weiss' assertion of invention, and by the witnesses Brill and Clark. Brill was employed by the Republic Company from late in 1910 until June, 1917. During that period, the Republic Company was using accelerators but those available were not entirely satisfactory, and Brill was making systematic efforts to develop others (Vol. I, p. 298-9, Q. 10-13). At first, Brill did most of the work himself, but during the summer of 1916 he was put in charge of the laboratory and development department and that work left him with insufficient time to carry on this investigation.

Brill talked the situation over with Clark and it was concluded that the Company should employ a chemist for the particular purpose of trying various organic materials in rubber compounds in the search for more satisfactory accelerators (Vol. I, p. 300-1, Q. 14; p. 441).

Baldwin is the man who was hired to do this work. He

started about the middle of 1916 under the guidance of Brill, trying various organic substances; and Brill was very careful to impress upon him the importance of keeping complete records in the X-book (Vol. I, p. 302-5).

A definite plan had been decided on for Baldwin's work. It was getting to be generally recognized among rubber chemists at that time that the best accelerators were organic substances which are basic and rich in nitrogen, and Baldwin was to experiment with organic substances of that character (Vol. I, p. 441, Q. 14). So Brill and his associates selected a number of such substances and directed Baldwin to test them and study the literature for suggestions of other promising substances and try them. The group of guanidines was one of those on the program of substances to be tried by Baldwin; Brill could not say specifically from memory after the lapse of so many years, that he instructed Baldwin to make tests with DPG but he did recall that the guanidines had been mentioned in the literature of rubber vulcanization as possible accelerators, and that his discussions with Baldwin of the work which the latter was to do included consideration of the guanidines (Vol. I, p. 308-9, Q. 43-4).

So, making test-slabs with rubber compounds containing guanidines as accelerators, and specifically DPG, was directly in line with the work for which Baldwin was hired and which he did for a period of over a year from the summer of 1916 on. Brill's statement of this (referring to the X-book) is as follows:

> "I would say that it would be very peculiar if, in going over this book, I did not find some work by Baldwin, in which he had tried these different guanidines. DPG would be one of them" (Vol. I, p. 308-9).

This is all corroborated by Mr. Clark (Vol. I, pp. 440-3) and he, like Brill, stated that the record of a test of DPG in the X-book is just what he would expect to find there because that would be in line with the work for which Baldwin was hired (Vol. I, p. 443, Q. 26-7).

The chemicals which Baldwin used as accelerators in the course of his tests were either prepared by Baldwin or were purchased from any one of several chemical supply houses. The X-book indicates at the bottom of page X-2000 (right) (Vol. II, p. 726) that one substance was obtained from the Holland Aniline Company and where directions for making another substance were obtained, and Brill, Clark and Baldwin told of the purchases of certain of the substances tried (Vol. I, p. 442, Q. 18-20; p. 304, Q. 30-32; p. 311, Q. 18-20). As to DPG, that could have been and probably was obtained from the house of Eimer & Amend as is shown by the testimony of Dr. Amend (Vol. I, p. 291-2, Q. 11-16).

In contending that the record of a test with DPG on page X-2005 was not in the X-book before Weiss' alleged conception of the idea of using DPG, plaintiff takes a position contrary to reason as well as to the evidence. The testimony of Baldwin and Brill and Clark is corroborated by various circumstances of convincing force. Also, in claiming that something which now appears in the X-book was not there on the date it bears and was not there for a long time thereafter, plaintiff is impunging the veracity and value of the very book it relies on and must rely on to prove its own case, the only dated record evidence it has of Weiss' work prior to the Kratz paper.

Weiss admitted that he made all of the entries on page X-2005 other than those we have stated were made by Baldwin, and in particular, that he wrote "On Shoddies" which appears at the top of the sheet directly under the title printed by Baldwin (Vol. I, p. 174, Q. 417, *et seq*). It is beyond belief that Weiss would have written "On Shoddies" at the top of the sheet under the line for the title unless there was something already written on the title line, and what was written on the title line was then just what is there now, the title put there by Baldwin.

There must have been something in the first column on page 2005 just as there is something in the first column

on the pages immediately preceding and following in the same characteristic printing of Baldwin. All of Baldwin's work was recorded on the first ten pages; each of pages 2001 to 2010 inclusive contains entries by Baldwin and the dates are all early in 1917. Furthermore, it is improbable that the first column of page 2005 was blank when Weiss made his entries on that page and that Weiss began a record of his own tests in the second column.

Weiss identified as his own handwriting the entries of the names "D Shoddy", "Z Shoddy", "C Shoddy", etc., appearing in the column of names of substances at the extreme left of page 2005 (Vol. I, p. 174, Q. 418). The first of these, "D Shoddy", is entered on the second line below the printed name "Guayule" so that something must have been entered on the first line to have caused Weiss to put "D Shoddy" on the second line, and what must have been there is just what is there now, namely, "DIPHENYLGUANIDINE".

Weiss was unable to recollect what entries were in the first column of figures and could not say whether or not there were any entries in that column, and he admitted finally that he did not recollect anything about it (Vol. I, p. 195, Q. 522).

It would be futile for anyone to claim that there was nothing in this column for certainly something must have been recorded on the page when Weiss made his entries there since otherwise he would not have written "On Shoddies" in the line below the title line, and he would not have left so much space below the printed word "Guayule" in writing "D Shoddy". So evidently there was some test recorded there. It must have included figures in the first column for figures and there must have been an accelerator used in the compound because the book was a record of tests with accelerators.

Plaintiff has asserted that a test was recorded in that first column but that "diphenylguanidine" did not appear in the column of substances. In fact, plaintiff has tried to make some point of the fact that the figures in the first column add

up to 101, as though whatever entry was there initially did not include one part of an accelerator and the original total was 100. But compounds adding up to 101 and 102 appear all through Baldwin's work recorded on the first 10 pages of the X-book. Also, there is no evidence of a change of an original total of 100 to the present total of 101. Also, the book shows no evidence of any change having been made where "diphenylguanidine" now appears. Also, if "diphenylguanidine" had not appeared there at all, Weiss would have written "D Shoddy" further up.

Then there is the evidence of the handwriting expert, Mr. Haring. He said he could find no evidence of any alteration on page 2005 of the X-book (Vol. I, p. 456, Q. 47-48). Also, he made a study of the printing of "diphenylguanidine" in comparison with the printing of the title "Action of Organic Accel." and the printing of others of Baldwin's entries and showed in a most interesting, and, we think, most convincing manner, that this word "diphenylguanidine" is entered in the same characteristic printing as the rest of Baldwin's work (Vol. I, p. 452-6, Q. 26-46). Even to the layman, it seems apparent that the entries were all made by the same hand. The printing is rather distinctive, particularly with respect to the letter "U" and the letter "N", as was pointed out by Mr. Haring, and it seems to us that even without the aid of a student of handwriting it would take very strong evidence to convince one that this word "diphenylguanidine" was not written in the book at the same time and by the same person who wrote "Action of Organic Accel." and such other matter as that appearing at the bottom of page 2001 (right).

Some effort was made to raise a doubt as to whether this entry of "diphenylguanidine" was put in the X-book by Baldwin in 1917 by reason of the fact that page 2005 and page 2008, two pages formed by the same sheet of paper, were withdrawn from the X-book and were not in it for a considerable period of time. Who took them out does not appear. But they were recovered before the *National* trial and have been identified by witnesses for both sides as the original sheets. For this reason, their temporary absence is now of importance

only in connection with the testimony of two of plaintiff's witnesses, Woodward and Vaill. These two witnesses for plaintiff said that they examined the X-book on May 11, 1922, and that page 2005 must have been in the book at that time, because if it had been absent, they would have noticed its absence and that the page could not have had "diphenylguanidine" on it because if it had, they would have noticed that (Vol. I, p. 639-642, Nat. Rec. p. 361-2). It is sufficient to say that they were mistaken, and, of course, in any such negative testimony, one could easily be mistaken. Defendant's proofs show definitely that on that date, May 11, 1922, when Woodward and Vaill said they examined the X-book, page X-2005 was not in the book. Its absence was discovered on May 8, 1922, and it was recovered at some time after May 11th, as is shown beyond doubt by the testimony of Barrows and Young (Vol. I, p. 473-484). Furthermore, Vaill merely said that the page was "not there, as far as I recollect" (Nat. Rec. p. 362). As to Woodward, he is an interested witness and furthermore no reliance should be placed on the testimony of any one who has attempted by improper methods to influence the testimony of a witness called by his adversary in a legal proceeding, as is shown to have been done by Woodward in the interference involving Weiss' application for a patent on DTG (See Ex. VV, p. 274-6 and *ante*, p. 53-4).

Two more of the plaintiff's witnesses, Carlton and Nellen, testified that this entry of diphenylguanidine was not in the X-book, but their testimony is purely negative to the effect that they did not recollect seeing it there. As was stated by this Court in *Stitt* vs. *Huidekoper*, 17 Wall. 384, 394:

> "a witness who testifies to an affirmative is to be preferred to one who testifies to a negative, because he who testifies to a negative may have forgotten. It is possible to forget a thing that did happen. It is not possible to remember a thing that never existed."

Carlton's testimony is an excellent demonstration of this proposition; after first testifying that there were entries of *tri*-phenylguanidine in the X-book when he

first examined it, he was unable to find in the X-book any entry of *tri*-phenylguanidine made prior to the time of that first examination (Vol. I, p. 626-7). We say that all of this negative testimony should be disregarded because it is so manifestly absurd for a witness to testify simply from recollection that a certain entry was *not* in a certain place many years ago, though he has no recollection of what was there. Carlton, moreover, is another witness of questionable credibility (*ante*, p. 39-40, and Vol. I, p. 628-632, Q. 108-130).

Under all these circumstances we think it must be concluded that the entries which Baldwin said he put in the X-Book in February, 1917, were put there at that time just as they appear there now, including the word "DIPHENYLGUANIDINE." Also, Weiss must have seen that entry in 1917 and 1918 when he made his entries on that same page and the pages following and when he took charge of the book immediately after Carlton left the employ of the Republic Company in March, 1918, and if that be so, Weiss's claim made for the first time in November, 1921, that he originated the idea of using DPG as an accelerator is not worthy of belief.

Two circumstances which add force to this conclusion are that when Weiss applied for employment at Firestone and again when he applied for employment with the National Aniline Co., he made no claim that he was the originator of that idea. At those times, he was extolling what he had done in the chemistry of rubber and had good reason to extol it because he was seeking employment as a rubber chemist and was much in need of employment (Vol. I, p. 157, Q. 324-5). On both of those two occasions, instead of claiming that he originated the idea of using DPG as an accelerator, he claimed only that he had originated a process of manufacturing DPG in commercial quantities, and he ascribed to Kratz the credit for having shown that DPG is of superior value as a rubber accelerator. This does not appear in detail in connection with his application for employment with the National Aniline Co., though it is sufficiently evident that he mentioned Dr. Kratz at that time, but on his application for

employment at Firestone, he wrote, "the value of this product as an accelerator has been discussed by Dr. Kratz" and "he has shown that .08% of this product is equivalent to 1% of aniline" (Ex. C, Vol. II, p. 824; and *ante*, p. 22-24).

These circumstances, the entry of Diphenylguanidine in the X-book by Baldwin and Weiss's failure to claim that he originated the use of DPG when there was every reason for him to put forward that claim if he really had done so, fully warrant the conclusion that he did not originate that idea.

Plaintiff's counsel have heretofore treated the Baldwin experiment solely as an attempt to prove a prior use and they argue that the Baldwin test was only an unsuccessful and abandoned experiment. We do not and never have urged it as a prior use and as the test is distinctly labeled "N. G.", of course it is not one. But it does show that the idea of using DPG as an accelerator was not an original conception of Weiss. Weiss got that idea from the X-book, where it had been recorded by Baldwin and where Weiss recorded his own work after Baldwin left the employ of the Republic Company.

FIFTH DEFENSE.

The Weiss Patent Does not Disclose a Patentable Invention.

We have shown that the use of organic substances as accelerators was well known and well established prior to the earliest date claimed by Weiss. The known art was summarized in the King paper of September 1, 1916 (Ex. I, Vol. II, p. 920-3). King classified the most important of the known organic accelerators and in doing so made reference to "Urea and Such Derivatives as Guanidine." A little later, on July 31, 1917, Twiss wrote a paper on accelerators in which he pointed out that almost all of the known effective organic accelerators are basic and that there is a rough proportion apparently existing between their activity and their

alkalinity (Ex. M, Vol. II, p. 924-931). Among the compounds which he discussed is a guanidine derivative known as "amino guanidine".

Another guanidine derivative, triphenylguanidine, had also been tried and had been found to be a very serviceable accelerator. Its use is acknowledged in the patent in suit to have preceded the alleged invention, and Weiss conceded that he knew about it prior to his alleged date of conception of the use of diphenylguanidine (Vol. I, p. 134, Q. 191). Carlton said he was familiar with the guanidines as a class in 1918 and discussed them several times with Weiss (Vol. I, p. 92-3, Q. 16).

How could any chemist, knowing that the guanidines as a class were accelerators, and knowing that triphenylguanidine was an accelerator, fail to think of diphenylguanidine, the next most closely related member?

Dr. Whitby, plaintiff's expert, said that as far back as 1912, it was recognized as a general rule that strong bases of a nitrogenous character were good accelerators and that on that basis a rubber chemist would expect DPG to be an accelerator without trying it, although he pointed out that the only sure way to find out in any case would be to try the substance in a rubber compound (Vol. I, p. 83-5, Q. 183-191).

Diphenylguanidine and triphenylguanidine are so closely related that authors on organic chemistry group them together, as they are grouped in Richter's text book under the common heading "Phenylated Guanidine Derivatives" (Vol. I, p. 559-560, and p. 63, Q. 55). In fact, diphenylguanidine and triphenylguanidine are the only phenylated guanidine derivatives appearing on the page of Richter's text book from which Weiss claims to have gotten his idea of diphenylguanidine, so that it would have been impossible for him to look up the known accelerator triphenylguanidine in his book without having diphenylguanidine face him from the same page (Vol. I, p. 135, Q. 204-5).

Diphenylguanidine was considered by Kratz merely as another member of the known guanidine group, and, since

the guanidines as a group had been referred to in the literature, Kratz thought it proper to refer to various members of that group, including diphenylguanidine, and to say in his paper "We have chosen to employ only substances which have been previously cited by others" (Ex. E, Vol. II, p. 826).

Accordingly, to a chemist familiar in 1918 with the guanidines in general and triphenylguanidine in particular, the most natural thing in the world would have been to think of diphenylguanidine as usable for the same purpose, and every rubber chemist would have known that the only way to find out would be to try it according to the routine methods of laboratory testing. Of course, he would first have had to obtain his diphenylguanidine, but it could be purchased (Vol. I, p. 290-6) and there were known methods described in the literature for producing it; any organic chemist seeking to do so could have produced it by following those directions, just as Kratz and Weiss did. Having produced it, the method of ascertaining its value was a matter of laboratory routine and the use of standard test formulae.

To most of us who are not organic chemists, the complex and elongated names of the organic chemicals used as accelerators might suggest that their composition and properties are abstruse subjects shrouded in much mystery; and the tests used by rubber chemists in testing accelerators might appear difficult and complex. But the fact is that these accelerators and these test methods are but the tools of the organic chemist and of the rubber chemist. He knows them through long study and frequent use. To him they are what a gear, a lever, a crank and other mechanical elements are to the designer of machines. He picks out the proper one from among those known to him, just as the designer of machines chooses that mechanical element which will serve his purpose, and when he has no rule which will lead him to an immediate selection of the proper chemical, he, like the designer of machines, resorts to a process of trial, using the expected skill of his calling.

So, in the present case, Weiss had the group of guanidines suggested to him by Carlton (*ante*, p. 39-40). Attention was also directed to them in the review of the subject by King, published in 1916 (*ante*, p. 102). Among this group of guanidines, the next closely related member to diphenylguanidine had been used as an accelerator and its use was brought to Weiss' attention prior to his alleged date of conception, *i. e.* triphenylguanidine.

In this situation we say that the selection of the next closely-related member of this known guanidine group and the testing of this particular guanidine by the customary test methods of testing accelerators was well within the limits of expected skill of the rubber chemist, the man skilled in the art. That is what the rubber chemist is doing day in and day out, just as it is what the designer of machines and the architect of buildings is doing day in and day out, namely, selecting elements closely related to those previously used or known to be useful and making the usual tests with them, according to standard and routine test methods and formulae.

Invention is something far beyond that. It has been characterized as a "leap of the imagination," an act which involves passing over those elements closely related to the ones which have been used and therefore known to be useful, to something distantly related or wholly unrelated by reaching out into the unknown and bringing into the field of utility something which the man skilled in the art would not have supposed was available or would not have known of at all. Crediting Weiss with all that is claimed in his behalf, he cannot fairly be said to have made an invention by being led by the use of triphenylguanidine as an accelerator to think that diphenylguanidine might be an accelerator too, trying it and finding out that it is (*Smith* vs. *Nichols*, 21 Wall. 112; *Atlantic Works* vs. *Brady*, 107 U. S. 192).

When Weiss applied to the Firestone Co. and to the National Company for a job (*ante*, p. 22-24), he made no claim that this idea which he says originated with him was an inven-

tion. Shortly thereafter, in the summer of 1920, Weiss said he learned that patents had been granted for certain accelerators (Vol. I, p. 168, Q. 387-9) but still he made no claim that his alleged conception of this use of diphenylguanidine was an invention and he and his associates proceeded with the manufacture and sale of diphenylguanidine without any assertion that its use as a rubber accelerator involved invention. Another year passed by and an application covering the **method of producing** diphenylguanidine was filed in July, 1921 (Ex. QQ, Vol. II, following p. 1002).

Only in November, 1921, over three and one-half years after Weiss claims to have conceived this idea, and then only in response to the exigencies of the commercial situation, was any claim made that the suggestion of the use of diphenylguanidine as an accelerator involved invention, notwithstanding the known availability of the guanidines as a group and the actual use of triphenylguanidine. So the filing of the Weiss application occurred after a period of nearly four years during which Weiss had accepted the view that the idea was not one which he could patent.

For these several reasons, we assert that what Weiss claims to have done was not an invention. In view of the prior art, as disclosed by the King and Twiss publications, and the acknowledged prior use of triphenylguanidine, and the admittedly known availability of the guanidines as a group, it was nothing more than what one would expect from a chemist in proceeding from the known substance triphenylguanidine to the extremely closely related substance diphenylguanidine. For that reason alone the patent should be held invalid.

Plaintiff has asserted that the Weiss patent involves not only the discovery that DPG is a good accelerator, but also the discovery that when DPG is used, the rubber produced is of a superior quality. This is true only with various qualifications, (Vol. I, p. 502-6, Q. 32-4; p. 536-9, Q. 14-26), but, assume for the moment that it is broadly true. The production of better rubber by the use of an accelerator of greater

activity is only what a rubber chemist would expect, and would have expected at any time back as far as Kratz's work at Norwalk in 1916. It was one of the known principles of vulcanization, known prior to 1916, that, other things being the same, greater acceleration is productive of better rubber (*ante*, p. 11-12).

But even if that had not been a known principle, no inventive act would have been involved in ascertaining that by using the DPG whose greater activity was discovered by Kratz, a better rubber would be produced. A good analogy would be the case of a baking powder used in making biscuit; if some inventor announced that some substance not previously used for the purpose is an excellent baking powder, there would be no invention in ascertaining that by the use of the new substance in accordance with the usual procedure of mixing the ingredients and baking, a superior biscuit is produced.

As this Court said in *Stow* vs. *Chicago*, 104 U. S. 547, 550:

> "It is shown that Stead invented this device. Whether he perceived and stated all its advantages is immaterial."

This Court also said in *Lovell Mfg. Co.* vs. *Cary*, 147 U. S. 623, 634:

> "It follows necessarily that the public can not be deprived of an old process because someone has discovered that it is capable of producing a better result, or has a wider range of use than was before known."

See also

Roberts vs. *Ryer*, 91 U. S. 150.

Furthermore, the proof submitted by plaintiff to carry Weiss's date of invention back of the Kratz paper includes nothing about the comparative quality of the rubber Weiss is alleged to have made in 1918 and 1919. That was considered by plaintiff to be wholly immaterial.

SIXTH DEFENSE.

Claims 1, 5 and 9 of the Weiss Patent are invalid by reason of special matters applying to them only.

Claims 1, 5 and 9 of the patent in suit define the patented invention as involving the use of a "disubstituted guanidine". This is a broader term including not only diphenylguanidine but also all other derivatives of guanidine in which two of the hydrogen atoms of the guanidine nucleus have been substituted by other groups.

These claims are invalid because the subject-matter thereof is disclosed in a magazine article published more than two years before the patent in suit was applied for. The article referred to is an article by Du Bosc published in a French magazine entitled "La Caoutchouc et la Gutta Percha" on July 15, 1919 (Ex. O, Vol II, p. 934-9).

This article is entitled "A Study of Accelerators," and is a discussion of many different guanidine derivatives as accelerators. It is stated that the accelerators commented on are substances which the author of the article had investigated, from which it appears that the comments in the article are based upon actual tests. Well along in the article there is a reference to "other interesting guanidine derivatives which are capable of acting as vitalizers (accelerators)," and this is followed by the names of several of these guanidine derivatives together with the chemical formula for each of them and comment on some of them (Vol. I, p. 488, Q. 19 *et seq.*). Among those appearing in this list is "diaminoguanidine."

The concluding sentence of the article is:

> "As results from the above account the series of amino compounds derived from urea and cyanamide is capable of yielding vitalizers (accelerators) which are rich in nitrogen and, consequently, exceedingly powerful."

This diaminoguanidine is a di-substituted guanidine, and, therefore, this Du Bosc publication, disclosing the use of diaminoguanidine as an accelerator of rubber vulcanization at a time more than two years prior to the filing of the application for the patent in suit, is a complete anticipation of those claims of the patent which attempt to define the patentee's accomplishment by the use of this broader expression adopted for the specific purpose of covering not only diphenylguanidine but also all other guanidine derivatives which fall within the class of di-substituted guanidines.

Diaminoguanidine is what is known as an unstable substance; if prepared in the pure state it would decompose and change into something else. As chemical dictionaries put it, this substance "does not exist in the free state" (Vol. II, p. 810, side folio 100).

When dealing with such substances, chemists know perfectly well what to do. They mix them with something else which does not affect their serviceability but does maintain them stable. In the case of an unstable amino-guanidine, they mix with it the necessary ingredients to form the bicarbonate salt of the aminoguanidine.

Not only was this common knowledge among chemists, (Vol. I, p. 491, Q. 24) but it is specifically stated in the literature of this art. Thus, an article by Twiss refers to the use of aminoguanidine as an accelerator, that is, mono-aminoguanidine instead of di-aminoguanidine, and states that inasmuch as that substance is unstable, it was used in the form of a bicarbonate salt (Vol. I, p. 491, Q. 24). Twiss said (Ex. M, Vol. II, p. 928):

> "I have also found that the unstable base aminoguanidine forms an excellent accelerator when applied in the form of its more stable bicarbonate salt."

That di-aminoguanidine is an effective accelerator of rubber vulcanization when used in the form of its bi-carbonate salt is stated definitely by defendant's witness, Bridgewater (Vol. I, p. 489-490, Q. 21). He demonstrated its effectiveness by actual trial (Ex. GG, Vol. II, p. 971).

It is no answer whatever to this to say, as plaintiff has said, that Weiss applied for his patent on his method of making DPG (Vol. II, following page 1002) on July 2, 1921, and that the publication of the Du Bosc article occurred less than two years prior to the application for that method patent. This is so because the method patent contains no reference whatever to disubstituted guanidines as a class or to any member of that class other than DPG.

Anticipation of these broad claims by this Du Bosc article is therefore complete, under the authority of *The Incandescent Lamp Patent,* 159 U. S. 465, in which this Court said at page 476:

> "In fact, such a construction of this patent as would exclude competitors from making use of any fibrous or textile material would probably defeat itself, since, if the patent were infringed by the use of *any such material,* it would be anticipated by proof of the prior use of *any such material.*" (Italics ours.)

Second, these three claims are invalid because they are broader than any invention made by Weiss. We have Weiss's admission that, prior to filing his application for the patent in suit, he knew of only two di-substituted guanidines which were accelerators, namely, diphenylguanidine and ditolylguanidine (Vol. I, p. 178, Q. 441). The fact is that there are innumerable other substances which fall within the broad definition of a di-substituted guanidine.

Defendant's witness Bridgewater said he thought there were between 50 and 100 such substances that had been prepared and 500 to 1,000 others which could be prepared if there were any occasion for doing so (Vol. I, p. 486, Q. 12). Of this large number, Weiss says he knew only two were accelerators at the time he filed his application for the patent in suit and yet he undertook to claim the monopoly of a patent for every one of the hundreds of substances about which he knew nothing, though all agree that the only way to ascertain definitely whether or not a substance will act as an accelera-

tor is to try it. Therefore, these three claims are of broader scope than any contribution which Weiss could have made to the accelerator art because they are broader in scope than such knowledge as Weiss possessed at the time he applied for his patent. A duplicate of this situation came before the Court of Appeals for the Second Circuit in *Matheson* vs. *Campbell,* 78 Fed. 910-915, in which the Court said:

> "In other words, having himself experimented only with three or four bodies out of a group of hundreds, he proposes to set himself in the pathway of future experimenters with any or all of the other bodies, and, as the result of each new experiment is disclosed, will fire away at it, calculating to 'hit it if it is a deer and miss it if it is a cow.' * * *
>
> The inventors did not make any such 'broad discovery.' They made the specific discovery that some di-sulpho acids, treated according to their process, would produce their product. * * *
>
> Some future experimenter will have to make some new discovery, and invent some new process, before these other sulpho acids can be transformed into naphthol-black. We are referred to no authority, and know of no principle, which will sustain the complainant's contention that he can thus, in the language of the circuit court, 'speculate on the equivalents of his claimed invention, and thereby oblige the public to resort to experiments in order to determine the scope of the claims of his patent.' "

See also:

Treibacher vs. *Roessler,* 219 Fed. 210, 212, C. C. A., 2nd Cir.;

Bracewell vs. *Passaic Print Works,* 107 Fed. 467, 473;

Rickard vs. *Du Bon,* 97 Fed. 96-99;

Kintner vs. *Atlantic Co.,* 249 Fed. 73-77.

Thirdly, these three broadly worded claims are invalid because there are various di-substituted guanidines which are not accelerators. Among the hundreds of di-substituted

guanidines which have been or can be made, defendant has tried some of them and has demonstrated that they are not accelerators of the vulcanization of rubber. This is stated positively by defendant's witness Bridgewater (Vol. I, p. 486-8, Q. 16-17). His testimony was based on actual tests and records of his tests are in evidence as Exhibit HH. The preparation of the substances referred to is covered by the deposition of defendant's witness Powers (Vol. I, p. 549-557).

The proofs before the Court show beyond question that there are these substances which are di-substituted guanidines (so that they fall within the definition of these claims) and which are not accelerators (so that they will not accomplish the purpose of the patented invention) and that is fatal to the validity of these broad claims.

Weiss undertook to "claim blindly the entire group of compounds" which is what the Court said "will not do" in *Bracewell* vs. *Passaic Print Works, supra.* The situation is similar to that presented in *Matheson* vs. *Campbell, supra,* where the patentee had experimented "with three or four bodies out of a group of hundreds" and did not know whether the others in the group were similarly serviceable; except that in this instance the patentee had experimented with not more than two out of a group of hundreds and now it appears that other members of the group are *not* serviceable for the purpose.

If Weiss had discovered some "general quality" common to all di-substituted guanidines which made all of them effective as accelerators, the situation presented would be different. But we know now that he did not make any such discovery because there are these numerous di-substituted guanidines which are not accelerators at all. Therefore, this defense is identical with that which was sustained by this Court in *The Incandescent Lamp Patent,* 159 U. S. 465, wherein the Court said at page 475:

> "If, as before observed, there were some general quality, running through the whole fibrous and textile kingdom, which distinguished it from every other, and gave

> it a peculiar fitness for the particular purpose, the man who discovered such quality might justly be entitled to a patent; but that is not the case here".

There is no "general quality" or "peculiar fitness" common to all the substances in the class of di-substituted guanidines. That peculiar fitness is possessed by only specific members of the class. For that reason it would be improper to sustain these broad claims whose wording was selected with the object and intent of covering a whole class of substances including innumerable substances of which Weiss knew nothing and various substances which are not accelerators at all. The *Incandescent Lamp Patent* is a precedent as directly applicable to this case as one could be and requires that these broad claims be invalidated. The whole of the announcement of principles in the opinion in that case on page 472 of 159 U. S. applies with equal force here and could be paraphrased with the names and substances involved in this suit.

In Conclusion.

Supplementing the foregoing presentation of specific defenses against the validity of the patent in suit, there are a few matters of general application which should be discussed, chief among them being the commercial exploitation of DPG and the conflicting decisions of the lower Courts.

Commercial Exploitation of DPG.

On the record before the Court, it may properly be said that plaintiff was the first to offer DPG for sale in quantity to rubber manufacturing companies. Also, there is proof of a license under the patent under which royalty has been paid. These two things will doubtless be urged upon the Court's attention. A brief discussion of them by defendant seems, therefore, to be required.

We have heretofore set forth in detail Weiss's work with the Republic Rubber Company in 1918 and the first part of 1919, how the Republic Company was preparing for the manufacture of TPG as an accelerator while nothing whatever was being done with DPG, how in September, 1919, Daniels heard Dr. Kratz's paper at the Philadelphia meeting and returned to the Republic plant with the copy of Kratz's table which he promptly showed to and discussed with Weiss, how beginning immediately thereafter there was feverish activity in the Republic plant in experimentation with DPG, and how on December 1, 1919, Daniels wrote to one of his assistants that he was "through with TPG" and that DPG "is the king pin now" (*ante*, p. 56-58).

Weiss's work with DPG in the late months of 1919, together with Kratz's data, made Weiss know that DPG was an excellent accelerator, and his investigations indicated that the literature contained practically no directions as to how to make DPG in quantity at low cost (Vol. I, p. 102, Q. 46-9). Accordingly, Weiss set himself to the task of devising a process for that purpose (Vol. I, p. 128, Q. 150). At some time in the winter of 1919-1920 he succeeded in devising such a process and by the time he was dismissed from the employ of the Republic Company in March, 1920, he had written out directions for a procedure suitable for producing DPG in quantity (Vol. II, p. 1025, Q. 28, and *National* Rec., p. 239, Q. 166-173). It was then that Weiss applied for employment with one after another of the rubber companies in Akron, including the Firestone Company (Vol. I, p. 128, Q. 153); and meeting with no success, he went to New York and applied first to the National Aniline & Chemical Company (Vol. I, p. 162, Q. 351) and then to Doty and Woodward (Vol. I, p. 129, Q. 156 and p. 163). We know that when applying to the Firestone Company and the National Aniline & Chemical Company he mentioned the Kratz paper as authority for the value of DPG and claimed that he had produced a process for making DPG, but did not intimate that he was concerned in any way with any discovery in con-

nection with DPG other than in manufacturing it (Vol. II, p. 1013-5 and 1023-30).

When Weiss applied to Doty and Woodward in April, 1920, they were and for some years past had been connected with the manufacture of chemicals used by the rubber industry (Vol. I, p. 129, Q. 156) and it was only natural that they should be interested in Weiss's story that he had devised a process for making DPG and that DPG was a better accelerator than those the rubber industry was then using. So Doty and Woodward and Weiss joined forces and after some few months began to manufacture DPG on a small scale and to offer it to the rubber trade. Along in 1921 they had a small plant at which the chemical was being turned out (Vol. I, p. 129-131). By July of 1921 they applied for a patent on Weiss's method of manufacturing DPG (Vol. II, following p. 1002) and also for a patent for some other accelerator (Vol. I, p. 169, Q. 392). Then in November, 1921, the application for the patent in suit was filed, and the patent issued in March, 1922.

In 1921, or before the patent issued in March, 1922, at least three other chemical manufacturing companies had put DPG on the market or were preparing to do so. In each instance these other companies knew of the Kratz paper of September, 1919, with its statement that DPG is far more active than TPG and its figures representing mathematically the degree of superiority. No one of these three companies has recognized the Weiss patent in suit (Vol. II, p. 1018-9, and p. 1009-12). More recently one other manufacturer has become a licensee under the patent in suit, but it should be noted that the license agreement covers a license not only under the patent in suit but also under the other Weiss patent for the method of making DPG and certain patents of foreign countries (Vol. I, p. 267-8, Q. 31-4).

These being the facts, we submit that no inference whatever may properly be drawn from them, and no sound argument may be based upon them, against the sufficiency of the defenses we have presented at length above.

Through the years since 1921, plaintiff and others have gone on selling DPG to the rubber industry and the substance has been used by the industry to such extent that its value as an accelerator is beyond question. It has not superseded all other accelerators and apparently never will, for there is no such thing as a universal accelerator (Vol. I, p. 410, Q. 334-5). Also, there are other accelerators which are more active, some of them very much more active and known as ultra accelerators (Vol. I, p. 417-8, Q. 358-367; p. 421, Q. 384-6). But several desirable qualities are combined in DPG which have led to its use on a substantial scale (Vol. I, p. 506, Q. 33).

But there is no occasion for harping on these facts in this suit. The utility of the patented accelerator has never been questioned, and the success of a plaintiff in its exploitation of a patented device is of consequence in a patent suit only on the question of invention. When the Court has determined, by reference to the patent and to the prior art, what it is that the patentee invented, then if the Court finds itself in doubt as to whether or not that achievement involved the exercise of invention, it is appropriate to consider whether or not the successful exploitation warrants resolving the doubt in favor of the patent. This is in accordance with *Smith* vs. *Goodyear,* 93 U. S. 486, and *McClain* vs. *Ortmayer,* 141 U. S. 419, 428, and numerous other cases.

But this matter of successful exploitation has no bearing on an issue of anticipation. If the patented idea was disclosed in prior patents, or was first invented by another, or was known to others before the patentee's invention, the patent in suit is void and that is the end of it. No amount of commercial success can alter the fact of lack of novelty or prior invention or prior knowledge or prior use. This proposition has even been asserted by this plaintiff when trying to explain why Weiss and Daniels and the Republic Company made no use of DPG; plaintiff has said:

> "The fact that the Company did not use DPG then or later in its commercial products has nothing at all to do with whether or not Weiss had completed his invention".

These considerations alone should suffice to dismiss the matter of successful exploitation from this case.

But there is another and equally strong reason for considering it of no consequence. Such success as this plaintiff has attained in exploiting DPG was due to the invention of a method of making DPG at low cost covered by the other Weiss patent, the one which is not in suit (Vol. II, opposite p. 1002). Up to the time when Weiss devised that method, DPG could be produced only by a time-consuming and expensive method which has been characterized in this case as the laboratory method; that method was outlined in the text-books on chemistry and it is the method used by Weiss in his early experiments and by Dr. Kratz as described in his Norwalk report (Vol. II, p. 954-5-6). That method is so expensive that no substance made at such a cost would be usable as an accelerator in commercial manufacture. This is stated to be the fact in the patent in suit in lines 36 to 44. It is also stated even more definitely in the other Weiss patent as follows (Vol. II, opp. p. 1002):

> "Prior to my invention it has not been possible to produce diphenylguanidine except in small quantities for use in chemical research and laboratory experiments. Even when produced for this purpose the product has been accompanied by the formation of comparatively large quantities of carbodiphenylimide, a thick treacle-like fluid, from which the diphenylguanidine is difficult to separate and which greatly reduces the yield of the latter."

Had the situation continued unchanged in this respect, DPG would never have been used commercially though every chemist in the rubber industry knew of its great activity. But in this situation Weiss devised his patented method of making DPG in the winter of 1919-1920 and it is to his production of that process of making DPG cheaply, and in being the first to devise such a process, that the effort of the plaintiff company to sell DPG to the rubber industry is due. As this plaintiff has heretofore said "Without it his vulcanization discovery was useless." And Woodward said he would

not have gone into the Dovan enterprise but for this process of making DPG cheaply (Vol. I, p. 248, Q. 45).

There is nothing novel in the situation thus presented. A similar situation was presented to this Court in *Lovell Manufacturing Co.* vs. *Cary*, 147 U. S. 623, 635, and the Court, speaking through Mr. Justice Blatchford, said:

> "It is contended, however, by the plaintiff, that the applicability of the former processes is contradicted by the fact that no one had used them for the manufacture of furniture springs, and that as soon as Cary's process was made known, the art of making furniture springs was revolutionized. But, it was said by this Court in McClain *vs.* Ortmayer, 141 U. S. 419-428 (35 L. Ed. 800 and 804):
>
> > 'That the extent to which a patented device has gone into use is an unsafe criterion even of its actual utility, is evident from the fact that the general introduction of manufactured articles is as often effected by extensive and judicious advertising, activity in putting the goods upon the market and large commissions to dealers, as by the intrinsic merit of the articles themselves;'
>
> and that while,
>
> > 'in a doubtful case, the fact that a patented article had gone into general use, is evidence of its utility, it is not conclusive even of that, much less of its patentable novelty.'
>
> In the present case, it appears that it was not until a short time before 1870 that furniture springs began to be commonly made of steel wire. It was not until 1868 when the general introduction of Bessemer steel and open hearth steel afforded a cheap substitute for iron, that the use of steel became general in the art in question. It was then natural that there should be introduced into that art methods of treatment which were well known as applied in allied arts."

See also

Shelby Steel Tube Co. vs. *Standard Seamless Tube Co.*, 286 Fed. 863, 869; C. C. A., 3rd Cir.

Dueber Watch-Case Mfg. Co. vs. *Robbins*, 75 Fed. 17, C. C. A. 6th Cir.

The Court of Appeals of the Second Circuit in the *National* Case illustrated this situation by reference to radium. If some one discovered that radium was an excellent accelerator, it may well be that he would be entitled to a patent for his discovery. But no commercial use of radium in manufacturing rubber would follow. However, if, after that discovery, some one, that same man or some one else, devised a process of extracting radium at a cost of 50 cents per pound instead of $50,000 per gram, then radium might come into quite general use as an accelerator, and certainly the discovery of that process of producing radium would be entitled to patent protection. In other words, there could be no commercial use until both inventions had been made, and in applying the two patents it would be quite essential to hold each of them to the particular invention covered by it, especially as the two inventions might have been made by two different men.

A similar illustration can be drawn directly from this field of accelerators. Dr. Kratz's paper of 1919 announced the high accelerating value of mono-phenylguanidine (MPG). So since 1919 rubber chemists and manufacturers have known that MPG is an excellent accelerator. But MPG has never been used commercially; the reason for this is that no one has as yet devised a process of making MPG at reasonably low cost.

Suppose some one should now invent a process of making MPG cheaply. Doubtless it would come at once into substantial commercial use. Also, the discoverer of that method of making MPG would unquestionably be entitled to a patent covering his process. But it is equally clear that he would not be entitled to a patent covering the use of MPG as an accelerator for the simple reason that the accelerating value of MPG has been a known fact even since Kratz published it in 1919.

It is obvious, therefore, that any credit for the commercial success of DPG as an accelerator cannot properly be ascribed to the alleged invention of the Weiss patent in suit;

and if any part or all of it is to be ascribed to the Weiss patent for his method of making DPG, that is a matter of no consequence in this litigation.

The Conflicting Opinions.

The opinion of the Court of Appeals for the Second Circuit in the *National* case is a clear, crisp, concise and positive statement of the issue presented by the record and the conclusion of the Court thereon. The opinion of the District Court in this *Corona* case, based on practically the same record, is equally definite in the statement of the conclusion reached and the reasons therefor, though the discussion is more extended, particularly in that it comments on, and rules upon, the credibility of the important witnesses.

The opinion of the Court of Appeals for the Third Circuit in this *Corona* case, on the other hand, is of strikingly different character. It is confused throughout, particularly with respect to ascertainment of the issue to be decided. Its outstanding characteristic is failure to grasp one of the fundamentals of this case, namely, that the issue and the only issue of this suit, is the validity of one and only one patent, *i. e.*, the patent which purports to cover the discovery that DPG is an active accelerator. That one patent was grouped and inextricably combined with the other Weiss patent which is *not* in suit, so much so that the greater part of the discussion in the opinion is irrelevant, and ascertaining the Court's views on the defenses presented is impossible. The Court appears to have concluded that Weiss contributed something toward the use of DPG in commercial rubber manufacture; and therefore the Court sustained the patent which happened to be before it without inquiry into the relation of the subject-matter of that patent to the commercial use.

The conclusion that Weiss had contributed something seems to have resulted largely or entirely from finding that Weiss or his company was the first to offer DPG for sale in

quantity to the rubber industry There appears to have been a complete failure to realize that such offering of DPG for sale in quantity could occur only after and as a result of two achievements, each wholly separate and distinct from the other, namely, (1) the discovery that DPG is an active accelerator, and (2) the discovery of a process for making DPG in quantity at low cost. These two are separate and distinct in the mental sense, as conceptions of the brain; and they are separate and distinct in the physical sense since they are investigated and demonstrated in wholly different ways, with wholly different apparatus, and by the application of wholly different principles. Also, they have been recognized as separate and distinct conceptions by the application for and the grant of separate patents in which they are disclosed and claimed.

It seems so elementary as not to require discussion that both of the two discoveries must have been accomplished before there could be any extensive commercial use of DPG in the manufacture of rubber, and yet that obvious fact seems to have escaped the attention of the two members of the Court of Appeals of the Third Circuit who joined in the opinion. The result was that the two Weiss patents were combined and everything that could be credited to Weiss in the art of vulcanization accelerators was treated as a potent item in favor of sustaining whatever Weiss patent happened to be before the Court.

Instances of the confusing and combining of the two Weiss patents though only one of them is in suit may be noted as follows:

The opinion states near the middle of page 1031, Vol. II:

> "* * * no one prior to Weiss seems to have conceived and worked out any practical plan by which DPG's potential powers could be commercially used. The reason for this is plain for no one knew, or, for that matter, had tried to learn, how DPG could be produced in such quantity as to make possible its commercial use".

This has nothing to do with the patent in suit. It relates to the patent which is not in suit, the later Weiss patent. That is the patent which tells

> "* * * how DPG could be produced in such quantity as to make possible its commercial use".

Weiss himself, who claims to have made the invention of the patent in suit in September, 1918, and who claims to have used DPG in the vulcanization of rubber in the winter of 1918-1919, said that the use of DPG commercially was not possible then and did not become possible until much later, when he devised the process disclosed in his later patent which is not in suit (Vol. II, p. 1002, side folio 297, l. 24-34). And Weiss's associate, Woodward, said he would not have gone into the business of exploiting DPG except for the process of the later Weiss patent (Vol. I, p. 248, Q. 45).

Near the top of the next page (1032) of the opinion, it is stated that Weiss

> "* * * turned his attention to discovering some way to make DPG commercially. His efforts in that line resulted in his discovery disclosed and practically utilized in the patent in suit".

This, of course, would find no support in any quarter. Weiss claims to have made the "discovery disclosed * * in the patent in suit" long before he gave any thought to a "way to make DPG commercially". "Discovering some way to make DPG commercially" resulted in the patent which is *not* in suit.

Lower down on the same page (1032) of the opinion, it is stated that if Weiss

> "* * * showed the world in addition how to make this product in commercial quantity in the rubber vulcanizing art, it would seem to us, and we so hold, that a claim, such for example as his eighth" (which is quoted) "was inventive in character and valid".

This statement discloses again what we believe to be the fundamental error of the opinion. "How to make this prod-

uct in commercial quantity" is the invention of the second patent. That patent discloses it and both plaintiff and defendant have so stated innumerable times. But if that achievement were of tremendous magnitude and were a great boon to humanity and the patent for it were a hundred times valid, that would have no bearing on whether or not some other patent is valid. Yet the Court states that because of that achievement of the patent *not* in suit, the patent which *is* in suit is valid.

Again, it is stated in the opinion in the lower part of page 1034, that

> "* * * no one had theretofore disclosed to the art or instructed it how DPG could be practically produced or, of course, practically used".

Again we point out that it is plaintiff's claim that Weiss completed the invention of the patent in suit before he gave any thought to "how DPG could be practically produced".

This same thing which we conceive to be a fundamental error pervades the discussion of the work of Dr. Kratz. The opinion states, in the middle of page 1035, referring to the authors of the Kratz paper:

> "Conceiving they had devised some way to make DPG commercially, did the paper tell the art how it could be done? That the paper did not give such information is clear".

No one has ever contended that the paper gave such information, or that it gave any information whatever about how to make DPG commercially.

The ideas expressed in these extracts from the opinion, and others of like purport, relate to the second Weiss patent, not in suit, covering Weiss's process of making DPG. It was that process which made commercial exploitation possible and which induced Doty and Woodward to attempt exploitation and which was used in initiating the exploitation that actually did take place (Vol. I, p. 248, Q. 44-6). This improper combining of the two distinct patents and the irrele-

vant discussion of the second patent and the unsound reasoning they led to seem to us to have developed from, and to be a not unnatural result of, failure to determine and formulate with particularity the issue to be decided, especially failure to ascertain with the requisite certainty the particular invention before the Court for adjudication.

An excellent instance of the exercise by this Court of meticulous care in ascertaining exactly what the patent in suit covered, and, on finding that it covered a specific substance or article, pointing out that the process by which that article was made was wholly irrelevant, is found in *Cohn* vs. *U. S. Corset Co.*, 93 U. S. 366.

Other outstanding points about the opinion are the following:

To the extent that it is possible to say from the opinion, the Court appears to have concluded that Weiss made the invention of the patent in suit in December, 1918 (Vol. II, p. 1031). In reaching that conclusion the Court appears to have given no consideration to the rule that the trial Court's decision on credibility of the witnesses produced is to be accepted by the appellate court in the absence of manifest error. Along with that, the Court appears to have attached no consequence to the discrepancies and contradictions in the various statements of Weiss, and the misrepresentations by, and the direct conflict between, Weiss and Daniels, which should have led to refusal to accept their testimony irrespective of the trial Court's conclusion. Also, in crediting Weiss with completion of the invention in December, 1918, no weight appears to have been given to the direct statement by Daniels, who was Weiss's immediate superior and to whom Weiss reported, that as late as the summer of 1919 he "wasn't prepared to say how good" DPG was (Vol. I, p. 222, Q. 135).

All of the proofs about the work of Dr. Kratz prior to reading his paper in September, 1919, were also passed over as not deserving mention. The defenses of prior knowledge, prior invention and prior use which had been sustained by the Court of Appeals in the *National* case, received no word of

comment; on what ground any one of those defenses was thought to be insufficient lies wholly in conjecture.

The Kratz paper is discussed in the opinion only to belittle it, though one of the witnesses for *plaintiff* characterized it as the most interesting paper on accelerators he had heard and the one which gave the most definite information (Vol. I, p. 216, Q. 92-5). It was so interesting and informative that those present when it was first read took notes (Vol. I, p. 212-3, Q. 71-5; p. 651, Q. 11-19; and Vol. II, p. 1023-4, Q. 4-9). The notes which Daniels took he immediately called to the attention of Weiss (Vol. I, p. 155-7, Q. 314-8; p. 217-9, Q. 102-111), and the effect was almost electric; immediately there was great activity in tests with DPG, entries of those tests appear in the X-book in great number, the long-continued development of TPG ceased abruptly, and the chief chemist of the plant wrote that he was through with TPG and that "diphenyl is the king pin now." And a few months later we find Weiss citing the Kratz paper as authority (Vol. II, p. 824) for the value of DPG as an accelerator, though the paper had not yet appeared in print. This last item, Weiss's application for employment at Firestone (*ante*, p. 22-24), is justly entitled to controlling importance in this suit and it receives no mention in the opinion of the Court of Appeals. There, in Weiss's own handwriting, made long before any controversy arose and before the thought of a patent was entertained, is Weiss's own tribute to the Kratz paper. It is the authority which Weiss himself, of his own volition, chose, to gain acceptance for his proposition that DPG is an active accelerator and that a rubber manufacturer would do well to make it by the process which Weiss claimed to have devised.

Finally, the opinion refers time and again to the presumption to be drawn from the action of the Patent Office in granting the patent, and yet the Court does not accept or concur in the views of the Patent Office which led to the grant of the patent. The Court held the Kratz paper insufficient as a disclosure of the invention of the Weiss patent, whereas the Patent Office held it to be a complete disclosure. The Patent

Office granted the Weiss patent only because it had no information as to what was done by Kratz prior to reading his paper, but all of the facts about Kratz's prior work were before the Court.

We note these points, which we think of as deficiencies in the opinion of the Court of Appeals, by way of contrasting the opinion with that of the Second Circuit Court of Appeals in the *National* case wherein there is a clear and exact statement of the issue to be decided, instead of confused intermingling of two unrelated achievements, and definite rulings on the defenses presented, instead of passing over those defenses without mention while magnifying matters of no consequence like the Kratz cross-examination and the Williams report. We have commented on the Kratz cross-examination above (*ante* p. 84-7). As to the Williams report, it characterizes the Kratz paper as "or particular interest" (Vol. II, p. 775), and what the report characterizes as "unimportant" (Vol. II, p. 776) is the "symposium * * * which followed" the reading of several papers, though it is evident that the Court erroneously considered this latter comment to apply to the Kratz paper.

The opinion of Circuit Judge Manton in the District Court in the *National* case is quite similar to that of the Court of Appeals in this case. For instance, Judge Manton said:

> "The Weiss tests recorded in the spring of 1919, were before the reading of the Kratz paper, and demonstrate that Weiss had been working on the production of diphenylguanidine in commercial quantities".

They demonstrated no such thing and no one ever contended that they did. No one representing *plaintiff* has ever asserted that Weiss began work on "the production of diphenylguanidine in commercial quantities" until long after these tests in the spring of 1919. Here again, items which if true would be tributes to the second Weiss patent, not in suit, are assigned as grounds for sustaining the first Weiss patent which in in suit.

As to Kratz's work, Judge Manton held that Kratz made the tubes at the Falls Rubber Company as alleged by defendant, but that the amount of DPG in them was too small to have a substantial curing effect, a proposition which not only was not sustained by the proofs in the *National* case, but has not even been advanced by plaintiff in this case.

Dr. Kratz's work at Norwalk at the end of 1916 was held to have been an abandoned experiment, though the Court specifically held that Kratz used DPG in making the tubes at the Falls plant in the following year, and, of course, publication followed a short time later.

Criticism of and answer to these opinions could be extended indefinitely. If we have given the Court an adequate exposition of the facts of this case, as we trust we have, the fallacies of the opinions will be apparent.

It is clear that the patented invention was *known* prior to the earliest date claimed for Weiss. Therefore, there is no sound theory on which the Weiss patent can be sustained and which conforms to the decisions of this Court in *Coffin* vs. *Ogden*, 18 Wall. 120, and the recent case of *Alexander Milburn Co.* vs. *Davis-Bournonville Co.*, 270 U. S. 390. In *Coffin* vs. *Ogden*, the alleged prior invention and prior knowledge were testified to by the prior inventor and by three other persons, and this Court, in declaring the patent in suit invalid, said:

> "The prior knowledge and use by a single person is sufficient. The number is immaterial."

In the *Milburn* case, this Court said:

> "Clifford had done all he could do to make his description public",

and all Clifford had done was to include a description in an application filed by him in the Patent Office on which no patent had yet issued. Here Kratz told his superior officer

about the invention and wrote out a description in the official record of his company and made a full disclosure orally and then in print, all before Weiss took the first step toward publication. This Court said:

> "The fundamental rule we repeat is that the patentee must be the first inventor",

and that rule we invoke here. This Court said further that it is not necessary to prove who was the first inventor but only that the patentee was not. Here defendant has gone further than was held to be necessary; it has proven who was the first inventor, and has shown an amount of prior knowledge substantially greater than was held to be sufficient in the *Milburn* case. And whereas in the *Milburn* case the proven prior knowledge found to be sufficient did not ripen into publication before the patent in suit was applied for, here there was wide publication more than two years before the application for the patent in suit was filed.

We submit, therefore, that the conclusions of the Court of Appeals of the Second Circuit in the *National* case should be adopted by this Court.

Respectfully submitted,

DEAN S. EDMONDS,
WILLIAM H. DAVIS,
FRANK E. BARROWS,
Counsel for Petitioner.

New York, N. Y., December 15, 1927.

CHRONOLOGY OF THE WORK OF KRATZ AND WEISS

KRATZ	WEISS
1916	
Kratz's Norwalk Tests. About 100 tests of eight different accelerators in rubber compounds, including 9 to 12 tests with DPG, resulting in a table of relative accelerating values (Vol. II, p. 838). Kratz fully corroborated by Russell and by written records.	
1917	
Kratz's Tubes made at Falls Co. in August and September. About 300 inner tubes made using DPG as accelerator and sold in the regular course of business.	
1918	
Kratz conducted a further series of tests at the Falls Co. with the same eight accelerators previously tested at Norwalk and obtained the table of relative accelerating values which appeared later in the Kratz paper.	Weiss alleged conception in February or March. No written record made. Three tests claimed to have been made by Weiss using DPG in December, all overcured. These tests were not recorded in the X-book; there is no record of them, and Weiss's affidavit says the amount of DPG he succeeded in making was insufficient for a test.
1919	
	Two or three tests using DPG made by Weiss in February and March. The date of one test has been altered in the X-book. The other two tests are on shoddy mixtures and showed no superiority of DPG over TPG. Between March 4 and September 10 no further tests using DPG were recorded in the X-book and Weiss's uncorroborated statement that some were made is inconsistent with his former testimony. Daniels, the Chief Chemist of the Republic Co. and Weiss's superior, said he was not prepared to say how good DPG was, and TPG was the accelerator being actively developed at Republic.

UNITED STATES PATENT OFFICE.

MORRIS L. WEISS, OF BROOKLYN, NEW YORK, ASSIGNOR TO DOVAN CHEMICAL CORPORATION, OF WILMINGTON, DELAWARE, A CORPORATION OF DELAWARE.

VULCANIZATION ACCELERATOR.

1,411,231. Specification of Letters Patent. Patented Mar. 28, 1922.

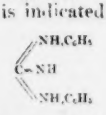
No Drawing. Application filed November 12, 1921. Serial No. 514,727.

To all whom it may concern:

Be it known that I, MORRIS L. WEISS, a citizen of the United States, residing in the borough of Brooklyn, county of Kings, city and State of New York, have invented certain new and useful Improvements in Vulcanization Accelerators, of which the following is a full, clear, concise, and exact description.

The object of my invention is to improve rubber compounds so that the finished product shall be of superior quality and so that the time required for vulcanization shall be greatly reduced over that ordinarily required for such purpose. It is known that when certain organic substances are added to the rubber mix during the compounding, a catalytic or similar action is produced which causes the rubber or similar gum to unite or react more rapidly and thoroughly with sulphur or other vulcanizing agents.

I have discovered that disubstituted guanidines particularly diphenylguanidine is particularly effective for this purpose. This substance is indicated by the formula



I am aware that disubstituted guanidines have been produced by laboratory methods and have been known to chemists for many years beginning about the year 1848 with the work of A. W. Hoffman (An. Chem. Pharm. 67–129), but down to time of my researches in accelerators of this type, it was apparently not known that di-substituted guanidines were efficacious or useful as accelerators in vulcanizing, nor that this substance could be produced in sufficiently large quantities in a substantially pure form, or at a sufficiently low cost to be available for this purpose.

I am aware that triphenylguanidine has been suggested, and probably used to some extent, as an accelerator in the vulcanization of rubber, but the use of diphenylguanidine for that purpose appears to have been unknown prior to my researches on this substance.

I have found that diphenylguanidine is much more powerful and efficacious as an accelerator in vulcanization than triphenylguanidine. For example, in the vulcanization of hard rubber articles the use of diphenylguanidine not only hastens the vulcanizating action but results in a final product much superior in texture, strength, durability and aging qualities over that when the triphenylguanidine is used. A greatly improved product also results when diphenylguanidine is used as an accelerator in the vulcanization of soft rubber compounds, particularly as regards elasticity, aging qualities and freedom from "bloom." In these and similar instances, it has been found that the use of triphenylguanidine requires from two to three times as long a period in vulcanizing as when diphenylguanidine is used, particularly at lower heat or steam pressures than those commonly employed.

In my prior application Serial No. 482,143 filed July 2, 1921, I have described and claimed a process for producing and purifying diphenylguanidine in commercial quantities, and have therein given a résumé of the historical development of the methods of producing the same.

As set forth in said application, I, at present, prefer to produce my improved accelerator by desulphurizing thiocarbanilide by the action of a metallic oxide, such as lead oxide, zinc oxide, etc., in an alcoholic solution of an ammonium salt, such as ammonium nitrate.

The present patent application therefore relates to the vulcanization of rubber or similar substances, in which disubstituted guanidines are employed as the accelerating agent or catalyzer, and particularly diphenylguanidine.

The method of carrying out my invention, which I at present deem preferable, may be illustrated by the following example:

The rubber may be compounded in the following proportions: 50 parts by weight of new rubber, 45.5 parts by weight of zinc oxide, 3.5 parts by weight of sulphur, 1 part by weight of diphenylguanidine.

These are mixed together in any suitable way, such as by milling, and then vulcanized or cured in the usual molds or otherwise under heat corresponding to a steam pressure of about 40 lbs. per square inch. This vulcanizing temperature should be continued until the compound is suitably vulcanized, which requires from 10 to 20

minutes depending upon the shape and size of the articles being vulcanized.

It will therefore be appreciated that when using the accelerator according to my invention the vulcanization is accomplished by using comparatively small quantities of the accelerator, thereby obviating undesirable loading or adulteration of the rubber compound. Furthermore, by the use of such accelerator, the texture and durability of the final product is greatly improved and the tendency commonly present in vulcanized rubber to bloom and become brittle with age is greatly reduced if not entirely obviated. My improved accelerator is particularly useful and valuable where it is desired to produce a harder or less elastic portion in an article leaving other parts which are required to be more elastic and flexible, such as in automobile tires where the beadstock is usually made harder than the body or carcass of the tire proper. The relative amounts of vulcanizing agent and accelerator may be so proportioned that the various parts of a single article may be cured to different degrees of hardness without danger of over-curing the softer or more elastic parts. I have found moreover that diphenylguanidine does not need zinc oxide to shorten the time of cure. I however prefer to use zinc oxide on account of its effects on the physical properties of the product.

Having thus described this example of my invention and the method of using the same, I do not wish to be understood as being limited to the exact proportions, ingredients, temperatures, etc., indicated, for various changes may be made without departing from the essential features of my invention as set forth in the accompanying claims.

What I claim and desire to protect by Letters Patent is:

1. The process of treating rubber or similar materials, which comprises combining with the rubber compound a di-substituted guanidine.

2. The process of treating rubber or similar materials which comprises combining with rubber compound a di-substituted guanidine comprising two phenyl radicles or groups.

3. The process of treating rubber or similar materials which comprises combining with the rubber compound an accelerator derived from thiocarbanilide in which the sulphur is substituted by an imide group.

4. The process of treating rubber or similar materials which comprises combining with the rubber compound diphenylguanidine.

5. The process of treating rubber or similar materials which comprises combining with the rubber compound a vulcanizing agent and a di-substituted guanidine accelerator.

6. The process of treating rubber or similar materials which comprises combining with the rubber compound a vulcanizing agent and a di-substituted guanidine comprising two phenyl radicles or groups.

7. The process of treating rubber or similar materials which comprises combining with the rubber compound a vulcanizing agent and an accelerator derived from thiocarbanilide in which the sulphur is substituted by an imide group.

8. The process of treating rubber or similar materials, which comprises combining with the rubber compound a vulcanizing agent and diphenylguanidine.

9. A vulcanizing compound of rubber or similar material combined with a vulcanizing agent and a di-substituted guanidine.

10. A vulcanized compound of rubber or similar material combined with a vulcanizing agent and di-substituted guanidine comprising two phenyl radicles or groups.

11. A vulcanized compound of rubber or similar material combined with a vulcanizing agent and an accelerator derived from thiocarbanilide in which the sulphur is substituted by an imide group.

12. A vulcanized compound of rubber or similar material combined with a vulcanizing agent and diphenylguanidine.

Signed at New York, N. Y., November 10th, 1921.

MORRIS L. WEISS.

UNITED STATES PATENT OFFICE.

MORRIS L. WEISS, OF BROOKLYN, NEW YORK, ASSIGNOR TO DOVAN CHEMICAL CORPORATION, OF WILMINGTON, DELAWARE, A CORPORATION OF DELAWARE.

PROCESS OF MAKING DIPHENYLGUANIDINE.

1,422,506. Specification of Letters Patent. Patented July 11, 1922.

No Drawing. Application filed July 2, 1921. Serial No. 482,143.

To all whom it may concern:

Be it known that I, MORRIS L. WEISS, a citizen of the United States, residing in the borough of Brooklyn, county of Kings, city and State of New York, have invented certain new and useful Improvements in Processes of Making Diphenylguanidine, of which the following is a full, clear, concise, and exact description.

Diphenylguanidine is indicated by the formula

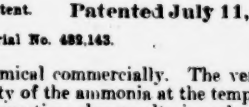
The object of my invention is the production of this substance in large or commercial quantities so that the same may be available in the chemical industries and particularly as an accelerator in the vulcanization of rubber compounds, as set forth in my co-pending application Serial No. 514,727, filed November 12, 1921, for vulcanization accelerators.

Prior to my invention it has not been possible to produce diphenylguanidine except in small quantities for use in chemical research and laboratory experiments. Even when produced for this purpose the product has been accompanied by the formation of comparatively large quantities of carbodiphenylimide, a thick treacle-like fluid, from which the diphenylguanidine is difficult to separate and which greatly reduces the yield of the latter.

Substituted guanidine was probably first synthetically produced in 1848 by A. W. Hoffman (Am. Chem.-Parm 67,—129). Dry cyanogen chloride gas was passed into anhydrous aniline, from which he obtained the hydrochloride of a base which he termed "melaniline," at that time.

In 1869, Hoffman (Ber. 11,—466) synthesized diphenylguanidine by an entirely different method from that previously used. Thiocarbanilide was desulphurized with lead oxide in a solution of alcoholic ammonia. The resulting product had the same properties as that of his first product except that its melting point was 147° C. instead of 120°–130° C.

By Hoffman's last method, a large quantity of polymerized carbodiphenylimide is produced, due to the volatility of the ammonia, and so reduces the yield of diphenylguanidine that it is not possible to produce the chemical commercially. The very high volatility of the ammonia at the temperature of the reaction also results in a large loss. Schall has shown (Ber. 27,—2696) that carbodiphenylimide has a tendency to polymerize into three different isomeric forms. This may be accomplished by either digesting by itself or with acids, or on standing for several hours:



Carbodiphenylimide being very unstable, changes into isomeric forms before the combination with ammonia takes place. The longer the combination is delayed the more of the isomers are produced. The isomers do not combine with ammonia to form diphenylguanidine.

Weith (Ber. VII. 10—16) who first produced carbodiphenylimide or desulphurized diphenylthiourea

has shown that it combines with ammonia probably to form diphenylguanidine and that it is polymerized to form carbodiphenylimide. It also combines with water to form diphenylurea. By taking advantage of these suggestions and using an alcohol-water solution and by substituting an ammonium salt such as ammonium nitrate, sulphate, or chloride, which are not volatile at the reaction temperature 65°–70° C., I am enabled to minimize to a large extent the production of polymerized carbodiphenylimide, which otherwise forms due to the volatility of the ammonia, and thereby obtain a larger yield of diphenylguanidine.

I also found that the percentage of concentration of the alcohol and water solvent had an important effect on the reaction.

One form of the process, which I at present deem preferable, may therefore be described as follows:

Thiocarbanilide is first produced by any suitable method but I prefer to mix 65 parts by weight of carbon bisulphide with 1 part of sulphur, and 120 parts of aniline is then added. The mixture is then brought to a temperature of about 35°–40° C. and kept at

that temperature for several hours after which it is allowed to cool. The semi-solid mass resulting is then spread out to allow an evaporation of the excess of carbon bisulphide and to dry the thiocarbanilide.

The solvent is then prepared by heating about 60 gallons of alcohol having a specific gravity of from .850 to .900 in a suitable kettle or tank and then adding 50 lbs. of ammonium nitrate and the thiocarbanilide above mentioned. The tank is closed by a cover and the temperature of the mixture is gradually raised to about 50° C. and stirred continuously by a mechanically operated stirring device. When said temperature is reached 200 lbs. of litharge are then added and the stirring continued for about one hour, during which time the temperature is gradually raised to about 75° C. At this point a test quantity is withdrawn and tested for thiocarbanilide and if not positive a few pounds more of litharge are added and the stirring continued for a short time or until the desulphurization is complete. The contents of the tank is then allowed to settle, the alcohol drawn off and removed from the lead sulphide by a suitable filter press or other means. The alcoholic solution is then distilled to a specific gravity of .950 and then mixed while hot with about 125 gallons of water and the solution boiled for about one hour. This causes all of the diphenylguanidine nitrate to dissolve, leaving the heavy treacle-like mass of polymerized carbodiphenylimide undissolved excepting a small portion of the latter which goes into solution and which may be removed by adding one or two pounds of "filter-cel," which is diatomaceous earth in the form of a powder used for the purpose of filtering. The solution is then syphoned off and allowed to cool, after which a 25% solution of caustic soda is added, while stirring vigorously until the precipitation is complete. When completely settled the supernatant liquid is drawn off, the diphenylguanidine is filtered out, washed with water and dried.

I have discovered that the diphenylguanidine thus obtained may be further purified for use in particular processes by dissolving and recrystallizing in toluol. The difference in the degree of solubility of diphenylguanidine in hot toluol over that when cold is very marked. It has been found that toluol at its boiling point will dissolve to form a 50% solution of this substance while cold toluol will dissolve only to about 2 per cent.

I therefore dissolve the diphenylguanidine in the portion of about 2½ lbs. of the latter to a gallon of toluol which is thus raised to a temperature of about 105° C. in a closed container. The hot solution is then filtered and allowed to cool, settle and to stand until crystallization is complete.

The crystals are then filtered out and washed several times with fresh or pure toluol to remove the remaining traces of the impurities. About 70 lbs. of pure diphenylguanidine is thus obtained.

Having described this example of the invention, I do not wish to be understood as being limited to the exact proportions, ingredients, temperatures, and steps set forth, for various changes may be made without departing from the essential features of my invention. For example, other solvents than alcohol may be used, such as wood alcohol, pyridine, etc., and other ammonium salts may be employed instead of ammonium nitrate above mentioned.

What I claim and desire to protect by Letters Patent is:

1. The process of making diphenylguanidine which comprises, desulphurizing thiocarbanilide by the use of a metallic oxide in an alcoholic solution of an ammonium salt.

2. The process of making diphenylguanidine which comprises desulphurizing thiocarbanilide by the use of a lead oxide in an alcoholic solution of an ammonium salt.

3. The process of making diphenylguanidine which comprises desulphurizing thiocarbanilide by the use of a lead oxide in an alcoholic solution of ammonium nitrate.

4. The process of making diphenylguanidine which comprises desulphurizing thiocarbanilide by the use of litharge in an alcoholic solution of ammonium nitrate.

5. The process of making diphenylguanidine which comprises dissolving an ammonium salt and thiocarbanilide in an alcoholic solution, then adding a lead oxide and heating to 75° C. to desulphurize the thiocarbanilide, then dissolving the diphenylguanidine nitrate thus formed, then separating the remaining carbodiphenylimide from said solution by causing precipitation with an alkaline solution, and then washing and drying the precipitate.

6. The process of making diphenylguanidine which comprises dissolving ammonium nitrate in an alcoholic solution, then adding litharge and heating to 75° C. to desulphurize the thiocarbanilide, then dissolving the diphenylguanidine nitrate thus formed, by distillation to a specific gravity of .950 and by addition of hot water, and then separating the carbodiphenylimide from said solution by causing precipitation by the addition of caustic soda, and then washing and drying the precipitate.

7. In a process of making diphenylguanidine the steps which comprise adding an alkali to a solution thereof containing carbodiphenylimide to cause precipitation, and then washing and drying the precipitate.

8. In a process of making diphenylguanidine the steps which comprise adding caus-

tic soda to a solution thereof containing carbodiphenylimide to cause precipitation, and then washing and drying the precipitate.

9. In a process of making diphenylguanidine containing as a reaction impurity carbodiphenylimide, the steps which comprise dissolving the same in hot toluol, cooling and then washing the crystals thus formed.

10. In a process of making diphenylguanidine containing as a reaction impurity carbodiphenylimide, the steps which comprise dissolving the same in hot toluol, cooling, and then washing the crystals thus formed with pure toluol, and then drying.

Signed June 28th, 1921.

MORRIS L. WEISS.

Office Supreme Court, U.
FILED
MAR 11 1927
WM. R. STARSE
CL

IN THE

Supreme Court of the United States.

OCTOBER TERM, A. D. 1926.

No. [redacted] 182

CORONA CORD TIRE COMPANY,

Petitioner,

vs.

DOVAN CHEMICAL CORPORATION,

Respondent.

BRIEF FOR RESPONDENT IN OPPOSITION TO PETITION FOR WRIT OF CERTIORARI.

JOHN W. DAVIS,
JAMES J. KENNEDY,
Counsel for Respondent.

The Byington Press & Publishing Co., Inc., 104 Fulton St., New York, N. Y.

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IN THE

Supreme Court of the United States,

OCTOBER TERM A. D. 1926.

CORONA CORD TIRE COMPANY,
Petitioner,

vs.

DOVAN CHEMICAL CORPORATION,
Respondent.

BRIEF FOR RESPONDENT IN OPPOSITION TO PETITION FOR WRIT OF CERTIORARI.

TO THE HONORABLE, THE CHIEF JUSTICE AND ASSOCIATE JUSTICES OF THE SUPREME COURT OF THE UNITED STATES:

On behalf of respondent, it is respectfully urged in opposition to the petition for writ of certiorari, that although the Circuit Court of Appeals for the 2nd Circuit held the Weiss patent in suit # 1,411,231 invalid, and the Circuit Court of Appeals for the 3rd Circuit in this case held it valid, the decisions are not as irreconcilable as petitioner alleges.

Statement of the Case.

To the extent that the validity of the patent was in issue in both cases, the issues are the same.

The evidence in the two suits is not "practically identical", as stated in petitioner's petition (page 1) and brief (page 1), but, on the contrary, materially different.

No important public or private interests are involved, as indicated in petitioner's petition (page 1) and brief (page 1).

Kratz paper read September 2-6.

The paper was of intense interest to the assembled rubber chemists. Portions of it, including the table of relative accelerating values, were copied by many of those present. Daniels said he had never heard a paper on accelerators that was so interesting or so informative and Shepard said it enabled rubber chemists to apply the accelerators sensibly.

Weiss learned of Kratz's paper from Daniels. Daniels gave Weiss a copy of the table of relative activities of the Kratz paper and instructed Weiss to work with DPG.

All work on TPG at Republic stopped abruptly after the Kratz paper and active work with DPG began.

Numerous tests made by Weiss using DPG during October, November and December.

1920

Kratz's paper published April 1st.

Weiss endeavored to obtain employment by claiming he had discovered a method of making DPG and he cited the Kratz paper as showing the value of DPG as an accelerator.

1921

Weiss's application filed November 12th.

4 yrs., 2 mos. after sale of Kratz Tubes.

3 yrs., 8 mos. after Weiss alleged conception.

2 yrs., 8 mos. after Weiss alleged reduction to practice.

2 yrs., 2 mos. after Kratz's paper and after Weiss learned of Kratz's paper.

1922

On the contrary, the only interest involved here is the private interest of petitioner.

National Aniline & Chemical Co., Inc. being a large chemical manufacturer not in the rubber business, was sued as a *contributory* infringer.

CORONA CORD TIRE COMPANY, petitioner, which is a tire manufacturer, was sued here as a *direct* infringer for using the process of the patent in suit, and producing and selling the product thereof, irrespective of where or from whom it obtained the materials used. Its interest is the only one to be considered here.

I.

Records in the two suits substantially different.

While we think the Court on the *National* record was wrong in holding the patent invalid, the record in the instant case is far more complete as to the failure of Kratz to make any invention or advance the art in any way by either his laboratory work, his lectures, or his writings.

It is shown in both records that what Kratz lectured about in September, 1919, and published in April, 1920,* is substantially what he had found out, *but not published or used*, at Norwalk in 1916, the tables differing only in the factor used for multiplication. In the table worked out by him at Norwalk in 1916 he gave the same relative values as in his lecture of 1919 and publication of 1920. In both cases Kratz was trying to evaluate different accelerators in terms of one another, to secure *the same result*, using aniline as 1 in the 1919 lecture and 1920 paper and as 3 in the 1916 Norwalk work. In the *National* case, the Court erroneously assumed these

* The statement as to this in Brief for Petitioner (page 7), namely, "The critical date, that of the publication, was September, 1919", is incorrect. The date of the publication, within the meaning of R. S. 4886, that is, as a *printed* publication, was April, 1920.

yardstick tables to be not only accurate but absolutely reliable.

In the instant case, respondent's expert witness Williams showed (R. 654) that the tables *could not be duplicated* and (R. 672) that following the Kratz table of equivalents of accelerators *would lead to absurd results.*

This same witness also testified in the instant case that he had heard the Kratz lecture of September, 1919, and produced his original report of that lecture showing that he had gotten nothing out of it.

In both cases, it was shown that respondent, operating under the Weiss disclosures of the patent in suit, first successfully marketed the invention and that others only entered the field in competition after respondent had shown the way and had opened up a large new field of accelerators.

In the instant case, for the first time, is the admission by Kratz, quoted in the decision of the Circuit Court of Appeals, that in giving the lecture he had not intended to give "any information which any other company or competitor could transpose directly for practical purposes".

The defense of public use by reason of Kratz having made tubes in 1917 with DPG was accepted in the *National* case, even though the Court found it "uncorroborated". This holding in the *National* case was in defiance of the rule of this Court enunciated in many cases to the effect that oral testimony of anticipation of a patent is insufficient (Barbed Wire cases, Expanded Metal cases, Loom Co. *v.* Higgins).

In the *National* case no employees of Falls Rubber Company other than Kratz were produced. In the instant case, other employees were produced by respondent, whose testimony was not contradicted in any way by petitioner.

In the *National* case, Kratz testified that *he made the tubes himself* and present counsel for respondent repeatedly so asserted in both brief and argument. The 2nd Circuit Court of Appeals in the *National* case erroneously believed that Kratz did make the tubes himself.

In the instant case, Kratz expressly admitted that *he did not make the tubes.* He further admitted that he did

not himself make up the batches of rubber compound from which the tubes were made. All he now says he did was to personally sift a white powder, which he says was DPG, into a batch or batches of rubber while being milled and that "not a soul" (R. 372, x-Q. 152) knew what the white powder was.

In the instant case, respondent called Shaw who testified, without contradiction on the part of petitioner, that he had been the regular compounder for making up rubber batches for tubes at Falls Rubber Company in 1917 and had no record or recollection of having made up a special batch for Kratz, nor had he ever heard Kratz mention DPG. Also, respondent called a mill man (Hoffman) formerly employed by Falls Rubber Company during the same period who had no recollection of ever having seen Kratz put anything into the batches on the mills.

Kratz, in order to further strengthen his story, stated in the instant case that he marked or told somebody to mark the DPG batches with red tags, but nobody else in the Falls plant ever saw such tags.

In the instant case, it was shown that in the course of manufacturing tubes, starting with compounding the batch, milling, calendering, wrapping the sheet stock on mandrels and curing, stripping and splicing, and marking and boxing, someone else than Kratz in the plant must inevitably have known of such special DPG red tagged tubes being made and sold, if they ever had been.

In the face of all this new evidence, the statement in petitioner's brief (page 6) that the Kratz testimony "is corroborated by related facts and by documents, the latter including a formula written by the witness in the laboratory note book kept by him in the regular course of his work", is incorrect.

The formula does not corroborate Kratz, because as written in ink it does not mention DPG or diphenylguanidine and only contains in pencil the mystic notation "M. or Diphig". There is only Kratz' uncorroborated word as to when he wrote this. The witness Shaw produced, in the

instant case, the T8 formula which is the one Kratz says was used for the tubes. The T8 formula produced by Shaw does not agree with the one given by Kratz in his private laboratory note book. Shaw did not testify in the *National* case.

In short, the record in the instant case as to Kratz is very materially different from the record in the *National* case by reason of damaging admissions by Kratz which he suppressed in the *National* case, and testimony and exhibits here produced for the first time by Williams, Shaw and Hoffman.

In another respect, the record here is different from that in the *National* case, and that is in the testimony by Weiss and his corroborating witnesses Nellen, Carlton and Daniels as to Weiss' activities in making DPG and in curing rubber before the Kratz lecture. The 3rd Circuit Court of Appeals accepted the X-book records of Weiss' first experiments as they appear, and found that Weiss had successfully reduced the invention to practice prior to the Kratz lecture, had then continued his efforts to produce DPG in commercial quantity, and had not abandoned his invention.

Some of the substantial evidence in this record and not in the *National* record is the following:

> Unworkability of Kratz' table as given in the lecture in September 1919 and publication of April, 1920,—shown by Williams.
>
> Contemporaneous record by Williams of the Kratz lecture, showing that the entire effort was to give out as little information as possible and find out as much as possible.
>
> Admission by Kratz that he did not intend to give information which competitors could transpose for practical purposes.
>
> Contradiction by Shaw and Hoffman of Kratz' alleged 1917 manufacture and sale of inner tubes.
>
> Admission by Kratz that "not a soul" knew what he was mixing into the batch of rubber compound on the mill.

No proof that the DPG batches were specially marked with red tags.

Giving by Nellen to Weiss of the MYE formula Exhibit 5 (Exhibits, p. 4) *before* the Kratz lecture, for the purpose of enabling Weiss to test DPG therein.

Additional corroboration by Daniels, Nellen and Carlton of Weiss' work on DPG and its manufacture in the spring and summer of 1919, *before* the Kratz lecture.

In the instant case, the Court, upon the whole record of Weiss' work, rightly as we submit, refused to hold his work prior to the lecture to have been "guided by no principle", as was held by the Court in the *National* case.

II.

No important public or private interests involved.

Petitioner states that by reason of these decisions a state of uncertainty and confusion now exists in the rubber manufacturing industry and in the chemical manufacturing industry which will adversely affect these industries to a substantial extent unless this Court shall take cognizance of this suit.

Petitioner also says that for it or other rubber manufacturers to use some other accelerator would be difficult, expensive, time-consuming and hazardous.

There is no evidence in the record or elsewhere that either the rubber or chemical manufacturing industries are at all concerned over this case. No other rubber manufacturer asked to intervene or be heard, nor did any chemical manufacturer. One large chemical manufacturer, Messrs. E. I. DuPont de Nemours & Company furnished several witnesses and considerable expert testimony for petitioner, but it refused to appear. Counsel for petitioner (R. 270-276) succeeded in having the offer of counsel for respondent, to prove

this concern the real defendant, overruled by the Court. We still believe this concern to be the real defendant, but do not see why this Court should go out of the way to protect such interests as it may have when it refused the opportunity to appear voluntarily. There is not the slightest evidence in the record that any chemical manufacturer, or rubber manufacturer other than petitioner, has any interest in this suit.

The record contains references to numerous other and non-infringing accelerators which are said by petitioner to be just as good as those covered by the patent and to be in substantial use. Petitioner went to considerable effort to prove that tri-phenyl-guanidine (T. P. G.), which is outside of the patent in suit, is as good as, if not better than, the accelerator of the patent in suit.

Since the patent in suit issued in March, 1922, a very large number of new and non-infringing accelerators have been developed and have gone into large consumption by the rubber industry in competition with that of respondent. Competition from these other and non-infringing accelerators is such as to absolutely compel respondent to sell accelerators at a price competitive therewith irrespective of the outcome of this or any other litigation.

The adverse outcome to petitioner of this case renders it liable for accounting, but petitioner is not a chemical manufacturer and its liability in profits, damages, and costs is relatively small.

A large percentage of the chemical industry and a larger percentage of the rubber industry have at all times acquiesced in the patent in suit, while others who have not heretofore acquiesced have expressed a willingness to acquiesce in the decision of the 3rd Circuit Court of Appeals. Hence, if the petition be denied, it is believed that the litigation on the Weiss patent would end without disturbance or excessive cost to either the chemical or the rubber industry.

Conclusion.

It is respectfully submitted that no case is presented for the grant of the writ of certiorari prayed for here and that the petition for such writ should, therefore, be denied.

JOHN W. DAVIS,
JAMES J. KENNEDY,
Counsel for Respondent.

Dated March 14, 1927.

Office Supreme Court, U. S.
FILED
JAN 10 1928
CHARLES ELMORE CROPLEY
CLERK

Supreme Court of the United States,

OCTOBER TERM, 1927.

No. 182.

CORONA CORD TIRE COMPANY,
Petitioner,

vs.

DOVAN CHEMICAL CORPORATION,
Respondent.

BRIEF FOR RESPONDENT.

JOHN W. DAVIS,
JAMES J. KENNEDY,
Counsel for the Respondent.

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